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REVIEW

Life adversities and suicidal behavior in young individuals: a systematic review

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Abstract Suicidal behavior in young people is a significant public health problem. However, it is not yet clear whether adversities (adverse life events) may be related to suicidality in adolescence and early adulthood. This paper aimed to investigate systematically the association between the type/number of adverse life events and experiences and suicidal behavior in young people. We developed a detailed strategy to search relevant articles in Pubmed, Scopus, PsycInfo, and Science Direct (January 1980–January 2015) about adverse life events and suicidal behavior. Adverse life events and experiences included maltreatment and violence, loss events, intra-familial problems, school and interpersonal problems. Studies were restricted to suicidal behavior in young people aged 10–25 years. The search yielded 245 articles, of which 28 met our inclusion criteria. Most studies reported a strong association between adversities and suicidality (both suicidal ideation and attempts). Based on the main results, the number of adversities or negative life events experienced seemed to have a positive dose–response relationship with youth suicidal behavior. However, the type of event experienced also appeared to matter: one of the most consistent findings was the association between suicidal behavior and experience of sexual abuse. More prospective studies are needed to elucidate the relative importance of risk accumulation and risk specificity for youth suicide.

Keywords Suicidal behavior · Adolescence · Life adversities · Abuse · Maltreatment

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Introduction

Adolescence is a period of changes that identifies the transition from childhood to adulthood. The need for independence and the acquisition of new abilities associated with several physical and brain changes during this critical period prepare the individual to assume adult roles [1]. Adolescence and early adulthood is also a period of increased vulnerability to mental ill health partly because of biologically based changes in brain structures involved in emotional/motivational functions that contribute significantly to risk-taking behaviors and sensation seeking [1, 2]—and a period of increased exposure to adverse life events, which may raise independently the risk of mental ill health [1]. A life event may be generally defined as "a detectable occurrence representing discrete changes in the subject's social or personal environment that is external and verifiable rather than internal or psychological" [3].

Adverse life experiences during development may induce significant biological changes (biological embedding) and modify the maturation and responsiveness of allostatic systems, thus exerting long-term effects on nervous, endocrine, and immune systems [4]. This is one of the reasons why exposure to adverse life events has been implicated not only in the development of several psychopathological disorders during adolescence and early adulthood—such as major depression, anxiety, disruptive behavior

[5], antisocial behavior and substance abuse/dependence [6], psychosis [7], and suicidal behavior [8, 9]—but also in physical ill health [10, 11]. For example, Flaherty and colleagues [10] found that more than 90 % of young adolescents in their sample had experienced some adversity, such as physical abuse, sexual abuse, psychological abuse, neglect, parental substance use, parental depression, or parental criminality, and more than 25 % had at least one health problem.

Suicide is the second most common cause of death during this period of life, the third cause of death in male adolescents (after car accidents and violence) and the first in female adolescents aged 15–19 years [12]. Major risk factors for youth suicidal behavior not only include sociodemographic, educational, psychiatric, and psychological vulnerabilities, but also family adversity, interpersonal difficulties among peers, and adverse life events [12] including specific adverse experiences, such as sexual or physical abuse [13–15] and maltreatment or neglect [8]. The association between these experiences and youth suicidality has received much attention. Several cross-sectional studies have found that sexual abuse is an independent predictor of suicidality in adolescence/early adulthood even after controlling for the presence of risk factors, such as major depression, hopelessness, and other life adversities [16, 17]. There are also longitudinal studies demonstrating a link between physical/sexual abuse and neglect and youth suicidality [18–24]. Some studies also investigated the roles of abuse and neglect relative to other adverse experiences. For example, Thompson et al. [23] reported the existence of a significant link between cumulative lifetime adversities and suicidal ideation. Individually, however, the most predictive adversities of suicidal ideation were childhood physical abuse, childhood neglect, childhood family violence, childhood residential instability, adolescent physical abuse, adolescent sexual abuse, adolescent psychological maltreatment, and adolescent community violence. Nonetheless, the role of specific as opposed to cumulative life adversities in youth suicidality is still poorly understood. With this systematic review, we sought to investigate the association between the type and number of adverse life events and experiences and suicidal behavior in young people.

Methods

Eligibility criteria

To achieve a high standard of reporting, we adopted the 'Preferred Reporting Items for Systematic Reviews and Meta-Analyses' (PRISMA) guidelines [25]. Adverse life events were as follows: (1) maltreatment and violence (sexual/physical/emotional abuse, emotional/physical neglect, witnessing home/community aggression); (2) loss events (separations, death of a parent or close friend); (3) intrafamilial problems (parental divorce, family instability, social or economic problems); (4) school and interpersonal problems (failure of grade in school or in exam, breaking up with a close friend, and poor social relationships).

We included studies that explicitly mentioned the association between negative/adverse life events and suicidal behavior (OR suicidal ideation OR suicidal thoughts OR suicide attempts, and excluding completed suicides) in clinical and non-clinical samples (for more details see below) aged 10–25 years.

We excluded studies on completed suicides through the psychological autopsy method because assessments of life events relevant to the decedent are frequently dependent on second-hand reporting. Based on the current literature, prospective surveys registering suicide victims have been also excluded as not focused on suicidality among those aged 10–25 years.

When a title or abstract seemed to describe a study eligible for inclusion, the full-text article was obtained and carefully examined to assess its relevance for our review.

Specifically, our exclusion criteria were as follows: (1) studies using adult (>25 years) samples; (2) studies published before 1980; (3) studies without abstracts or with abstracts that did not explicitly mention the association between suicidal behavior in adolescence/early adulthood and negative/adverse life events or life adversities; (4) studies that were not published in English; (5) studies including subjects who died by suicide and using the psychological autopsy method.

Information sources

We conducted a systematic search of 4 major electronic databases comprising medical and social science studies (PubMed, Scopus, Science Direct, and PsycINFO) for titles and abstracts (January 1980–January 2015) relevant to our research question. We additionally hand-searched bibliographies from retrieved articles and from published reviews. We also contacted study authors for further details about the included studies.

Search terms

The following search query was used in Pubmed: adolescent (MeSH) AND Suicide (MeSH) AND (epidemiology OR rates OR trends OR incidence) AND [adverse life events (MeSH) OR adversities OR maltreatment (MeSH) OR abuse (TI) OR neglect (TI) OR parental death (TI)]. In Scopus, the search query was: TITLE (adolescent) AND TITLE-ABS-KEY (suicide) AND TITLE-ABS-KEY (adverse life events). Another search strategy was used

about the same topic in Science Direct: (TITLE-ABS-KEY (adolescent) AND TITLE-ABS-KEY (suicide) AND TITLE-ABS-KEY (life events). In PsycInfo, the search query was "adolescent" AND "suicide" OR "ideation" AND "life events" OR "abuse" OR "parental death."

Selection of studies

Articles were screened and selected in a two-step process to minimize bias. First, two independent researchers (C.M. and G.P.) conducted the literature search. Any discrepancies between the two reviewers who, blind to each other, examined the studies for possible inclusion were resolved by consultation with the senior reviewers (E.F. and M.A.). In the second phase, full-text articles that met our inclusion criteria were retrieved and independently reviewed by G.S. and M.P, who discussed the design and characteristics of the studies to test whether they could be included in the review. If doubts remained, the study was put on the list of those awaiting assessment, pending acquisition of more information, and then was carefully re-analyzed for possible inclusion. Any disagreements in this step were resolved by discussion between reviewers.

Data collection process

A data extraction document was developed [23]. C.M. and G.P. independently extracted the following data elements from the 28 studies included in this review (see 'Study sample' below): author/s and publication year, study design, sample size, follow-up, main findings, and main adversities (see Table 1). Reviewers acquired the full text of all 28 articles. The principal reviewers (G.S. and M.P.) analyzed independently all studies. Any disagreements were resolved by discussion with the senior reviewers (E.F., M.A.), who also independently read all articles.

Summary measures

We assessed the selected 28 studies for quality using the following criteria: (1) representativeness of the sample from the general population (0–2 points), (2) presence and representativeness of a control group (0–2 points), (3) presence of follow-up (0–2 points), (4) evidence-based measures of adverse life events/adversities (e.g., Child Trauma Questionnaire, Life Events Checklist, or other psychometric evaluation) (0–2 points), (5) presence of raters who identified independently the presence of adverse life events (0–2 points), (6) statistical evaluation of inter-rater reliability (0–2 points), and (7) evidence-based measures of suicidal ideation or suicide attempts (e.g., Suicide Risk Scale, Suicidal Ideation Questionnaire, Beck Hopelessness Scale, or other psychometric evaluation) (0–2 points). Quality scores ranged from 0 to 14. Studies were differentiated in quality as follows: (1) good quality (10–14 points) if most or all the criteria were fulfilled, or, where they were not met, the study conclusions were deemed very robust; (2) moderate quality (5–9 points) if some criteria were fulfilled, or, where they were not met, the study conclusions were deemed robust; (3) low quality (0–4 points) if few criteria were fulfilled or the conclusions of the study were not deemed robust. Caution was exercised in interpreting the findings from the low-quality studies (Tables 2, 3, 4).

Results

Study sample

The searches in Pubmed, Scopus, Science Direct, and PsycInfo databases revealed, after the removal of duplicates (17 articles), a total of 235 potentially relevant articles. In particular, the search in Pubmed generated 149 articles, that in Scopus and Science Direct generated 20 and 45 additional articles, respectively, and the search in PsycInfo provided other 38 articles. Of these, 124 were excluded because they were without an abstract or had an abstract that did not explicitly mention suicidal behavior (or suicidal ideation, suicidal thoughts, or suicide attempts) and adverse life events. Four articles were excluded because they were not published in English, and 8 were studies published before 1980. Therefore, 111 full-text articles remained. Of these, 81 were excluded because they did not critically analyze the link between adverse life events and suicidal behavior in adolescence/early adulthood, and 2 were excluded because they were psychological autopsy studies. Thus, 28 articles met our inclusion criteria and were, therefore, used for the present review. Figure 1 summarizes the main results of the search strategy (identification, screening, eligibility, and inclusion process) used for selecting studies.

Study types and sample characteristics

We selected 11 cross-sectional studies including 31,833 individuals, 4 case–control studies including 72,979 subjects and 69,497 controls, 7 longitudinal follow-up studies including 6113 individuals, and 6 retrospective studies including 45,455 subjects and 423,670 controls. Clinical samples included mainly adolescents with major depression or borderline personality disorder, and adolescent inpatients at risk for suicide.

Table 1 Selected cross-sectional studies investigating the association between early adverse life events and adolescent suicidal behavior ($N = 15$)

References	Study design	Sample size	Main findings	Life events	Quality score	Quality differentiation
Baldry et al. [43]	Cross-sectional study	998 Students	Half of the sample reported direct victimization at school. Direct and relational school victimization were associated with suicidal cognition in youths. Harm by father for boys/girls and mother for girls were a strong predictor of suicidal cognition	1 Victimization at school; 2 Exposure to domestic violence; 3 Harm from parents	I = 2 II = 0 III = 0 IV = 2 V = 0 VI = 1 VII = 2 Total score = 7	Moderate quality
Bhatta et al. [30]	Cross-sectional study	3156 Adolescents in a juvenile detention facility	Experiencing sexual abuse and homelessness were associated with increased odds of suicidal ideation, while sexual abuse, homelessness and running away from home were associated with increased odds of suicide attempts. Sexual abuse was the strongest LE predictor for both suicidal ideation and suicide attempts. With an increasing number of adverse LEs, the odds of SB increased, indicating a positive dose–response relationship. Those who had experienced all four adverse events were 7.8 times more likely to have ever attempted suicide compared with others who had not experienced those events	1 Sexual abuse; 2 Drug or alcohol abuse by a member of the household; 3 Running away from home; 4 Homelessness	I = 2 II = 0 III = 0 IV = 1 V = 0 VI = 0 VII = 1 Total score = 4	Low quality
Bensley et al. [34]	Cross-sectional study	4790 Students	Abuse history was significantly associated with suicidal behavior, and the increase in estimated risk was greater for combined sexual abuse and molestation relative to non-sexual abuse or molestation alone. In addition, the association was higher for more severe forms of suicidal behavior such as injurious suicide attempts relative to non-injurious suicide attempts, plans, or thoughts	1 Sexual molestation; 2 Sexual abuse; 3 Physical abuse	I = 2 II = 0 III = 0 IV = 1 V = 0 VI = 0 VII = 1 Total score = 4	Low quality
Jakobsen and Christiansen [40]	Case–control study based on a National Longitudinal Register	72,765 (3465 registered suicide attempters matched with 69,300 population-based CS)	Adolescents who had lost a biological parent demonstrated a significantly increased risk of attempting suicide. The loss of the remaining parent approximately doubled this risk. There were no significant differences between different causes of parental death	Death of a biological parent	I = 2 II = 2 III = 0 IV = 1 V = 0 VI = 0 VII = 1 Total score = 6	Moderate quality

Table 1 continued

References	Study design	Sample size	Main findings	Life events	Quality score	Quality differentiation
Horesh et al. [31]	Case–control study	60 (20 MDD, 20 BPD, 20 CS divided in: MDD + suicide attempts; BPD + suicide attempts; no psychiatric disorders + no suicide attempts	Both groups of suicidal patients showed a significantly higher number of stressful LEs in the 12 months before the suicide attempt compared to controls. There was no significant difference between MDD and BPD adolescents. MDD adolescents reported more death-related events relative to BPD and CS, and BPD youths were more likely to report lifetime sexual-abuse events. Regardless of the nature of the adverse event, accumulation of stressful LEs throughout a year period was related to SB	1 Death of first-degree relative 2 Losses (separations, losses of other relatives or friends) 3 Sexual abuse	I = 0 II = 1 III = 0 IV = 2 V = 1 VI = 2 VII = 2 Total score = 8	Moderate quality
Kaplan et al. [37]	Case–control study	99 Physically abused adolescents and 99 CS (adolescents who were not abused)	The frequency of attempts in the adolescents who were abused was not significantly different from that in the community sample. Abused adolescents had a higher cumulative burden associated with family disintegration and inadequacies in family support relative to those in the community sample. Attempters who had been abused were more likely to have a lifetime conduct disorder, a lifetime disruptive disorder, and current conduct disorders compared to non-attempters. Exposure to suicide attempts by family or friends was higher in abused attempters than non-attempters	Physical abuse	I = 1 II = 2 III = 0 IV = 1 V = 0 VI = 0 VII = 2 Total score = 6	Moderate quality
Kaplow et al. [29]	Cross-sectional study	625 Adolescents	There was a significant association between the number of adverse LEs and risk of SB. Emotional suppression mediated the relationship between adversity, suicidal thoughts/attempts above and beyond demographic variables and depressive symptoms	Negative LEs Breaking up with boyfriend/girlfriend; Death of a close friend; Failure of grade in school	I = 2 II = 0 III = 0 IV = 2 V = 0 VI = 0 VII = 2 Total score = 6	Moderate quality
King et al. [27]	Cross-sectional study	1285 Children and adolescents with prior suicide attempts or suicidal ideation alone	Suicide attempters had experienced more stressful LEs than those with suicidal ideation alone. After controlling for gender, age, race, socio-economic status and site, a statistically significant association between SB and stressful LEs, poor family environment, parental history of psychiatric disorder and low parental monitoring emerged	Negative LEs in the past 12 months	I = 2 II = 1 III = 2 IV = 2 V = 0 VI = 0 VII = 2 Total score = 9	Moderate quality

Table 1 continued

References	Study design	Sample size	Main findings	Life events	Quality score	Quality differentiation
Laederach et al. [44]	Cross-sectional study	148 Adolescents aged 15 to 19 years	Important risk factors for attempted suicide in adolescence were: affective disorders, increased frequency of comorbidity, SB among family members and acquaintances, impaired health, poor school and professional integration, and sexual abuse	Sexual abuse	I = 2 II = 0 III = 0 IV = 1 V = 0 VI = 0 VII = 1 Total score = 4	Low quality
Lipschitz et al. [39]	Cross-sectional study on a inpatient sample (adolescent psychiatric unit)	71 Adolescent inpatients	Sexual abuse and emotional neglect were significantly related to self-mutilation and suicidal ideation. Sexual abuse was a significant predictor of lifetime suicide attempts. Emotional neglect was more important than physical abuse/neglect or emotional abuse in triggering SB	1 Childhood traumatic events (sexual, physical, and emotional abuse; physical and emotional neglect). 2 Adolescence traumatic events (witnessing home violence, witnessing or being the victim of community violence, accidental physical injuries, physical/sexual abuse)	I = 1 II = 0 III = 0 IV = 2 V = 0 VI = 0 VII = 2 Total score = 5	Moderate quality
Liu and Tein [28]	Cross-sectional study	1362 Adolescents	Adolescents who experienced more negative LEs had an increased risk of SB. There was a dose–response relationship between the number of negative LEs and risk of SB. Both internalizing and externalizing problems mediated the effect of LEs on adolescent SB	Negative LEs including family (e.g., beaten by parents), school (e.g., failure in an exam), interpersonal (e.g., break up with a close friend) and individual (e.g., serious illness) experiences	I = 2 II = 1 III = 0 IV = 2 V = 0 VI = 0 VII = 2 Total score = 7	Moderate quality
Martin et al. [17]	Cross-sectional study	2485 Adolescents	Sexual abuse was more prevalent in girls, and was strongly and independently associated with SB. Frequency and severity of SB was greater in sexually abused adolescents. In girls, depressive symptoms, hopelessness, and poor family functioning mediated the relationship between abuse and SB. Abused (compared to non-abused) boys had a 10-fold increased risk of making suicidal plans and threats and a 15-fold increased risk of attempting suicide, after controlling for current levels of depressive symptomatology, hopelessness, and family functioning	1 Sexual abuse; 2 Family dysfunction	I = 2 II = 0 III = 0 IV = 1 V = 0 VI = 0 VII = 1 total score = 4	Low quality

Table 1 continued

References	Study design	Sample size	Main findings	Life events	Quality score	Quality differentiation
Roberts et al. [19]	Cross-sectional study	4443 Adolescents	13 % of adolescents (12.2 % male and 13.7 % female) reported abuse by an intimate partner. In regression analyses, abuse by an intimate partner was associated with higher levels of risk behaviors such as substance abuse, antisocial behavior, and SB in females. It was also associated with an increase in depressed mood among both males and females	Abuse by an intimate partner	I = 2 II = 0 III = 0 IV = 2 V = 0 VI = 1 VII = 1 Total score = 6	Moderate quality
Salzinger et al. [38]	Case–control study	75 Physically abused preadolescents and 78 CS	Abuse was significantly associated with elevated risk of both suicidal ideation and suicide attempts. Adolescent attachment to parents and internalizing problems contributed independently to the prediction of suicidality risk in abused and control subjects	Physical abuse (based on a City Child Maltreatment Register)	I = 1 II = 2 III = 2 IV = 0 V = 0 VI = 0 VII = 2 Total score = 7	Moderate quality
Xing et al. [42]	Cross-sectional study	12,470 Students	Suicide attempts were reported by 2.7 % of students. Stressful family LEs were strongly associated with increased risk of self-reported suicide attempts. In logistic regression analyses (controlling for socio-demographic characteristics and lifestyle variables), there was a significant independent impact of improper parental rearing behavior (e.g., physical discipline, less caring, and much control), separation from parents (e.g., parental divorce) and social problems of family members (e.g., parental gambling problems) on risk of suicide attempts	Stressful family LEs: Improper parental rearing behavior; Separation from parents; Social problems of family members; Poor material conditions of family life; Family members' adversity	I = 2 II = 0 III = 0 IV = 1 V = 0 VI = 0 VII = 1 Total score = 4	Low quality

BPD borderline personality disorder, *BD* bipolar disorder, *CS* control subjects, *LEs* life events, *MDD* major depressive disorder, *SB* suicidal behavior

Study quality assessment

According to our quality score system, the mean score of the 28 studies that were included in this review was 5.8. Most of studies ($N = 15$) were of moderate quality, 3 were of good quality, and 10 of low quality. Below we discuss the main findings from these 28 studies, grouped by life event specification.

Studies on the association between the number of adverse life events and suicidal behavior

In general, it appears that adverse life events cause distress. McKeown et al. [26] showed in a 2-year follow-up longitudinal study that negative life events (such as financial problems, death of a parent or a close friend, parental divorce, and childhood abuse) were significant predictors of subsequent suicide plans (OR 1.10). King et al. [27] confirmed this relationship but also showed differential effects by type of suicidal behavior: suicide attempters were significantly more likely to have experienced stressful life events compared with suicide ideators. Similarly, Liu and Tein [28] showed, in a sample of 1362 Chinese adolescents, that negative life events occurred most frequently in suicide attempters, followed by suicide ideators and finally non-suicidal adolescents, suggesting a dose–response relationship between number of negative life events and suicidal behavior. Importantly, this relationship remained significant (although it was strongly attenuated) even after controlling for the presence of internalizing/externalizing problems. More recently, the Kaplow et al.'s [29] cross-sectional study confirmed the significant positive relationship between the number of adverse life events experienced and risk of suicidal ideation, but also partly explained (38 %), via emotional suppression, the effect of adverse events on suicide attempts. The positive dose–response relationship between the number of adverse life events (such as sexual abuse, drug or alcohol abuse by a family member, running away from home and homelessness) and risk to attempt suicide was also confirmed by Bhatta et al. [30], in another cross-sectional study on 3156 adolescents at a juvenile detention facility. Bhatta and colleagues also reported that the risk to attempt suicide was almost 8 times higher for those who had experienced all of these adversities compared to those with no such experiences.

These relationships were also established with longitudinal data. For example, Thompson et al. [23] confirmed that the number of lifetime adversities was associated with adolescent suicidal behavior, but also showed that the impact of adversities early in life could vary depending on whether they occurred during childhood or adolescence. Psychological maltreatment and sexual abuse had a lower impact if they occurred in childhood, and a higher impact if they were experienced in adolescence. Furthermore, childhood adversities moderated the effects of adolescent adversities on suicidal ideation; the effects of adolescent adversities on adolescent suicidal behavior were stronger at lower (compared to higher) levels of childhood adversities. Nrugham et al. [21] also showed moderation, this time by type rather than timing of adversity. Violent life events were strongly associated (OR 3.85) with suicide attempts but only if experienced, not witnessed.

The association between number of adverse life events experienced and adolescent suicidal behavior was confirmed in clinical samples as well. Stone et al. [24] found that female inpatients with higher rates of dependent events at baseline were at higher risk (42 vs. 21 %) of suicidal behavior during the 34 weeks following their discharge from hospital. Horesh et al. [31] in a case–control study comparing the effect of stressful life events on suicidal behavior in three groups of adolescents (suicide attempters with Major Depressive Disorder, suicide attempters with Borderline Personality Disorder, and healthy controls) reported that suicidal patients experienced a significantly higher number of stressful life events in the year before their suicide attempt compared with healthy controls.

Studies on the association between maltreatment and suicidal behavior

The link between maltreatment—such as sexual, physical, or emotional abuse—and suicidal behavior in young people was investigated in twelve studies. Although maltreatment, in general, was related to suicidal behavior [32], effects appeared to differ by its type. Sexual abuse was the type most consistently and strongly associated with suicidal behavior [17, 30, 33]. For example, Bensley et al. [34] in a cross-sectional study on 4,790 students reported that the association between history of abuse and suicidal behavior (in five levels of severity: "none," "thoughts," "plans," "non-injurious attempts," and "injurious attempts") was stronger for combined sexual abuse and molestation compared with non-sexual abuse or sexual molestation alone. In addition, the association was stronger for more severe forms of suicidal behavior, such as injurious suicide attempts (OR 47.1) compared to non-injurious suicide attempts (OR 12.0), suicide plans (OR 6.8) or suicidal thoughts (OR 4.4). Injurious suicide attempts, different from self-injurious behavior ('self-harm') [35, 36], may be described as attempts aimed to kill oneself by intentionally cutting, burning, bruising, or otherwise self-injuring.

The role of physical abuse in suicidal behavior in young people is less clear. There are reports of null effects [37], although some studies suggest an independent

association, even after accounting for sexual abuse. For example, Johnson and colleagues [18] found that, after controlling for covariates, sexual and physical abuses were significantly associated with risk of suicide attempts during late adolescence/early adulthood (ORs 7.22 and 5.10, respectively). A 6-year follow-up study [38] also suggested that a history of physical abuse increased the risk of suicidal ideation and suicide attempts (ORs 3.6 and 5.6, respectively), even after controlling for gender and other factors. Finally, Brezo et al. [20] showed that the prevalence of lifetime suicidal ideation was higher in their physically abused group (36.6 %) compared to the non-abused group (25.4 %), although those who were sexually abused had higher odds of repeated and late-onset suicide attempts and suicidal thoughts than those who were physically abused. Importantly, the prevalence of lifetime suicidal ideation was higher for young people who experienced both sexual and physical abuse (58.1 %). That study also showed that the impact of abuse frequency on suicide attempts depended on the identity of the abuser, with abuse by a member of the immediate family carrying the greatest risk (RR = 5.0).

The role of emotional abuse or neglect in suicidal behavior was investigated in two studies. Lipschitz and colleagues [39], who conducted a cross-sectional study on 71 adolescent inpatients, found that emotional neglect was a significant predictor of both suicide attempts and self-mutilation. They also reported that emotional neglect was more strongly associated with suicidal ideation and self-mutilation than physical abuse or physical neglect. Tanaka et al. [22] in a 2-year follow-up study found that low self-compassion, which was associated with emotional abuse and neglect, was significantly related to psychological distress and suicidal behavior.

Studies on the correlation between parental death, parental divorce, or family climate and suicidal behavior

The correlation between parental death, parental divorce, or family climate (such as parenting and inter-parental relationship) and suicidal behavior among young people was investigated in six studies. In general, parental death appeared to raise the odds of youth suicidal behavior [40] particularly if the death was a suicide [41]. Parental divorce and also the overall family climate appeared to be associated with this risk, as well. For example, Johnson and colleagues [18], in a longitudinal study conducted on a community sample of 659 families, found that parental separation or divorce was associated with subsequent suicide attempts (OR 1.20). However, maladaptive parenting and harsh parental discipline also raised significantly the odds of suicidal behavior. The role of these and other, related, aspects of the family environment was explored in four studies. King et al. [27] reported significant associations between suicidal behavior and poor family environment (OR 3.6), low parental monitoring (OR 5.0), and parental history of psychiatric disorders (OR 2.0). Liu and Tein [28] found that inter-parental conflict was related to both suicidal ideation (OR 1.94) and suicide attempts (OR 2.67), and Xing et al. [42] confirmed the link between suicidal behavior, harsh parental discipline and maladaptive parenting. By contrast, a supportive and positive family climate appeared to be a protective factor for suicidal behavior in youth. McKeown et al. [26] found that family cohesion was a significant protective factor for suicide attempts although not for suicide plans or suicidal ideation.

Studies on the association between school/interpersonal problems and suicidal behavior

Three studies investigated the association between school/interpersonal problems and suicidal behavior. Baldry et al. [43] found that both direct and, more strongly, relational victimization at school were positively associated with suicidal cognition in youth, and Johnson et al. [18] that a high level of school violence was significantly related to suicide attempts (OR 3.53). Liu and Tein [28] examined, in a sample of rural Chinese adolescents, the role of several school-related problems and adverse experiences in suicidal behavior. Of those, school dissatisfaction had the largest OR (2.34) for suicidal ideation, followed by very high parental expectations (OR 1.99), and change of (or suspension from) school (OR 1.98). The risk of suicide attempts was raised for those who failed in an examination (OR 2.93), felt pressure to enter a better school or college (OR 3.23), and changed or were suspended from school (OR 3.16). However, when all life events and school experiences and other covariates such as age, gender, and family socio-economic status were considered simultaneously, only school dissatisfaction and very high parental expectations remained significant predictors of suicidal ideation (ORs 1.87 and 1.51, respectively). None predicted, independently, the risk of suicide attempts.

Conclusions and discussion

Summary of main findings

The main purpose of this systematic review was to investigate the association between experience of negative life events and suicidal behavior in adolescence and early adulthood. The adversities examined included (1) sexual abuse and molestation (sexual abuse without sexual contact); physical abuse and maltreatment; child abuse and

neglect not otherwise specified; (2) family dysfunction and exposure to domestic violence; (3) separation from or death of a biological parent, family member or close friend; parental divorce; (4) poor interpersonal relationships and breaking up with boyfriend/girlfriend; (5) victimization/distress at school. Based on the main findings from our selected studies, experience of adversities or negative life events was significantly related to youth suicidal behavior [17–24, 26–47]. Another important finding was that some adversities are very common, as is the distress associated with experiencing multiple adversities [18, 24]. The third important finding from this review was the strong, positive dose–response relationship between number of events experienced and risk of suicidal behavior [23, 28, 29]. However, it also appears that the relationship between life adversity and suicidal behavior may differ by type of suicidal behavior. For example, young people who had attempted suicide were significantly more likely than those with suicidal ideation to have experienced stressful life events [21, 27, 31, 36]. In turn, the correlation between suicide attempts and adverse life events seems to differ by type of life event. Young people were at higher risk of suicide attempts if they had experienced maltreatment (e.g., abuse or neglect) [22, 39], and, again, this association differed by type of maltreatment, in line with other studies [13]. Our review suggested that sexual abuse, rather than physical abuse or neglect, appears to be more strongly associated with suicidal behavior [20], with sexual abuse being a particularly powerful predictor of several types of suicidal behavior in young people [17, 30, 33, 36, 48, 49]. For example, in the study of Martin and colleagues [17], sexually abused boys had a 10-fold increased risk of making suicidal plans and threats and a 15-fold increased risk of attempting suicide compared to those who were not abused. (By contrast, the findings about the role of non-sexual physical abuse in suicidal behavior were equivocal [37, 38]). Furthermore, it appears that the impact of sexual abuse is particularly severe if the perpetrator was a family member or an intimate partner. For example, Brezo et al. [20] showed that sexual abuse by a member of the immediate family was associated with the highest suicide risk, perhaps because such abuse occurs more frequently in families with multiple difficulties that do not usually guarantee safe conditions after abuse. Also, sexual abuse by a family member can exert long-term consequences on the development of healthy attachment patterns that are needed for mental health [50]. Sexual abuse by an intimate partner also appears to carry significant risk, such as elevated levels of antisocial, violent, and suicidal behavior [19].

As well as the type, the timing of maltreatment seems to matter for suicidal behavior in young people. Earlier onset of maltreatment/abuse is associated with more adverse mental health outcomes, in general [51–53], but also with suicidal behavior. As shown by another recent study [54], those exposed to physical and sexual abuse in childhood or adolescence were more likely to experience high levels of depression and suicidal ideation in young adulthood, compared to those who were not exposed to any maltreatment. Interestingly, among those who experienced maltreatment, first exposure during the early childhood period was associated with the most negative outcome. In particular, those first exposed to physical or sexual abuse during early childhood reported a 77 and 146 % increase in the odds of depression and suicidal ideation, respectively, compared to those individuals first maltreated later in adolescence. Early, compared to later, exposure to maltreatment in childhood may be associated with the most negative consequences because it occurs in a biologically sensitive period. Abuse and neglect early in life impact significantly on brain development, resulting in emotional, social and cognitive impairments, in turn increasing the risk of psychiatric conditions [55–59], psychopathological and attachment disorders, emotional dysregulation, abnormal stress reactivity and executive dysfunction [60, 61], and, as suggested by the studies we reviewed, suicidal behavior.

However, even less severe forms of childhood adversities can impact on suicidal behavior in young people. Our review showed that factors, both in the school and the home context, that were associated with poor mental health outcomes in young people [62, 63] were also related to youth suicidal behavior. Victimization at school [43], school dissatisfaction [28], and experience of school violence [18] were all related to suicidal behavior in young people. Risk factors in the family included poor family environment, low parental monitoring, low family support and cohesion, inter-parental conflict [26–28, 42], and loss of a family member [40, 41]. Early parent loss, especially by suicide, was particularly important. Young people who had lost a parent by suicide early in life were three times more likely to die by suicide themselves than their non-bereaved peers, and more likely than those who had lost a parent as young adults [41].

Of course, not all children exposed to such adversities will show suicidal behavior later in life. It is, therefore, important to consider, albeit briefly given our study aim, the role of protective factors. In general, there has been a study on the role of protective factors in suicidal behavior [64], but few studies have explored their role in buffering the effects of adverse life events, especially in adolescence. A recent review has pointed to the importance of a positive attributional style, higher levels of agency, and greater social support [65], but more research is needed.

Table 2 Selected longitudinal studies investigating the association between early adverse life events and adolescent suicidal behavior ($N = 7$)

References	Study design	Sample size	Presence of follow-up	Main findings	Life events	Quality score	Quality differentiation
Brezo et al. [20]	Longitudinal study (school based cohort)	1684 Adolescents	13-Year follow-up study	First, a strong association between history of SB in adolescence and childhood abuse was reported. Furthermore, the identity of the abuser moderated the relationship between abuse frequency and suicide attempts. Importantly, individuals who were abused by their intimate family were at the highest risk	1 Childhood physical abuse; 2 Contact sexual abuse	I = 2 II = 1 III = 2 IV = 2 V = 0 VI = 0 VII = 2 Total score = 9	Moderate quality
Johnson et al. [18]	Community-based longitudinal study	659 Families with children aged 1–11 years	17-Year follow-up study	Sexual abuse was associated with increased risk of SB during late adolescence/early adulthood. Moreover, parental separation/divorce was associated with suicide attempts at T3. Childhood adversities such as harsh parental punishment and physical abuse increased the risk of SB during late adolescence/early adulthood. Importantly, having experienced high levels of school violence was significantly related to SB, and severe interpersonal difficulties with peers were significantly associated with risk for SB during late adolescence/early adulthood (they mediated the association between maladaptive parenting or abuse during childhood and suicide attempts in adolescence)	1 Childhood adversities*; 2 Maladaptive parental behavior; 3 Childhood physical and sexual abuse; 4 Negative LEs and severe interpersonal difficulties	I = 2 II = 0 III = 2 IV = 2 V = 2 VI = 0 VII = 2 Total score = 10	Good quality
McKeown et al. [26]	Community-based 1-year longitudinal study	359 Adolescents	12-Month follow-up study	Family cohesion was a protective factor for suicide attempts, but not for plans or ideation. Impulsivity was a significant predictor of suicide plans, but not ideation or attempts. A history of prior SB was associated with suicide plans, ideation, and attempts. Finally, negative LEs were significant predictors of suicide plans, attempts, and ideation	LEs; Family adaptability and cohesion	I = 2 II = 0 III = 2 IV = 2 V = 0 VI = 0 VII = 2 Total score = 8	Moderate quality
Nrugham et al. [21]	Longitudinal study	2464 Adolescents	5-Month follow-up study	Violent LEs were associated with suicide attempts. Among those who experienced violent LEs, only victims were more likely to attempt suicide. Finally, higher resilience protected from suicide attempts	Traumatic LEs Lifetime bereavement Lifetime violent events (victim or witness) Other lifetime traumatic events	I = 2 II = 1 III = 2 IV = 1 V = 2 VI = 2 VII = 1 Total score = 11	Good quality

Table 2 continued

References	Study design	Sample size	Presence of follow-up	Main findings	Life events	Quality score	Quality differentiation
Stone et al. [24]	Longitudinal study	90 Adolescent inpatients	6-Month follow-up study	Girls with higher rates of dependent events at baseline were at higher risk (42 vs 21 %) for SB during the 34 weeks following discharge from hospital. Dependent events were significant predictors of SB, even after controlling for confounding variables.	Major LEs relevant for children and adolescents	I = 1 II = 0 III = 1 IV = 2 V = 2 VI = 2 VII = 2 Total Score = 10	Good quality
Tanaka et al. [22]	Longitudinal study	117 Adolescents	2-Year follow- up (testing every 6 months)	Childhood emotional/physical abuse and emotional neglect were associated with reduced self-compassion. Furthermore, after controlling for age and gender, emotional abuse was significantly associated with reduced self-compassion. Finally, youths with low self-compassion were more likely to report psychological distress, alcohol use and a serious suicide attempt compared with those with high self-compassion	Childhood traumatic events (physical/sexual/emotional abuse, physical/emotional neglect)	I = 2 II = 0 III = 2 IV = 2 V = 0 VI = 0 VII = 1 Total score = 7	Moderate quality
Thompson et al. [23]	Longitudinal study	740 Youths	12-Year follow-up study	There was an association between cumulative lifetime adversities and suicidal ideation. Sexual abuse and psychological maltreatment had reduced impact if they occurred in childhood, and higher impact if they were experienced in adolescence, respectively. Finally, effects of adolescent adversities were stronger at reduced levels of childhood adversities	1 Maltreatment**; 2 Witnessed violence (family and non-family); 3 Instability (residential instability and caregiver instability)	I = 2 II = 0 III = 2 IV = 1 V = 1 VI = 1 VII = 1 Total score = 8	Moderate quality

LEs life events, *SB* suicidal behavior

* Childhood adversities have been defined as the death of a parent, disabling parental injury or illness, living in an unsafe neighborhood, low maternal age, low parental educational level, parental separation or divorce, peer aggression, low family income, school violence, presence of an individual who experienced a crime in the household, upbringing by a single parent

** Maltreatment has been defined as physical abuse, sexual abuse, psychological maltreatment, and neglect

Table 3 Selected retrospective studies investigating the association between early adverse life events and adolescent suicidal behavior ($N = 6$)

References	Study design	Sample size	Main findings	Life events	Quality score	Quality differentiation
Deykin et al. [45]	Retrospective case–control study	159 Adolescents who had attempted suicide, 318 subjects treated for medical conditions not related to suicide attempts	Adolescents who attempted suicide were three to six times more likely to have a prior contact with social services compared with controls	1 Child abuse 2 Child neglect	I = 2 II = 2 III = 0 IV = 0 V = 0 VI = 0 VI = 0 VII = 0 Total score = 4	Low quality
Plunkett et al. [46]	9-Year retrospective study	183 Young adolescents	Adolescents who had experienced child sexual abuse were 10.7-13.0 times more likely to die by suicide than the national average. Overall, 32 % of those who had been abused had attempted suicide whereas 43 % had suicidal thoughts at the time they were abused. Finally, abuse by an acquaintance, parental denial or anger with the child were risk factors for suicide attempts	Sexual abuse	I = 2 II = 2 III = 2 IV = 1 V = 0 VI = 0 VII = 0 Total score = 7	Moderate quality
Rew et al. [33]	Retrospective study	96 Young homeless	Rate of sexual abuse was higher in homeless compared to non-homeless youth. Adolescents who had experienced sexual abuse were significantly more likely to have considered suicide in the past 12 months	Sexual abuse	I = 1 II = 0 III = 0 IV = 1 V = 0 VI = 0 VII = 1 Total score = 3	Low quality
Rhodes et al. [32]	5-year population-based retrospective cohort study	179 Youths who have experienced maltreatment with a first ED presentation for SB at risk for repetition and 6,305 population-based peers	Youths with substantiated maltreatment were twice as likely to repeat suicide attempts as their peers, even after adjusting for social, clinical, and demographics factors	Substantiated maltreatment	I = 2 II = 0 III = 2 IV = 0 V = 0 VI = 0 VII = 0 Total score = 4	Low quality

Table 3 continued

References	Study design	Sample size	Main findings	Life events	Quality score	Quality differentiation
Riggs et al. [47]	Retrospective study	600 adolescents (grades 9–12)	Overall, 5.2 % reported prior physical abuse, 5.4 % sexual abuse, and 2.7 % physical/sexual abuse. Those with a history of physical abuse were almost twice as likely to use illicit drugs; six times more likely to self-induce vomiting; five times more likely to attempt suicide than non-abused peers. Also, those with a history of sexual abuse were three and a-half times more likely to be sexually active and more than three times more likely to attempt suicide than non-abused peers	1 Physical abuse 2 Sexual abuse	I = 2 II = 0 III = 0 IV = 1 V = 0 VI = 0 VII = 1 Total score = 4	Low quality
Wilcox et al. [41]	Retrospective cohort study based on a National Survey	44,397 offspring of suicide decedents, 41,467 offspring of accident decedents, 417,365 offspring of parents who died for other causes, and 3,807,867 offspring of alive parents	Offspring of suicide decedents were at greater risk for suicide than offspring of alive parents. The risk for offspring suicide is directly related to the developmental period during which parental suicide occurred. Child and adolescent offspring of suicide decedents were three times more likely to be at risk for suicide whereas young adult offspring were not at increased risk	Parental death Suicide; Accidents; Other causes	I = 2 II = 2 III = 0 IV = 0 V = 0 VI = 0 VII = 0 Total score = 4	Low quality

BPD borderline personality disorder, *ED* emergency department, *LE* life event, *MDD* major depressive disorder, *SB* suicidal behavior

Table 4 Most relevant clinical findings about the association between suicidal behavior and life adversities by type of adversity

References	Life adversities: adverse life events	Suicidal outcomes	Statistics
Baldry et al. [43]			*B* and (*t*) values
	1 Low SES	Suicidal cognition	0.015 (0.42) (NS)
	2 Harm from the father		0.155 (3.69)
	3 Relational victimization in school		0.146 (3.87)
	4 Harm from the mother X gender		0.112 (2.82)
Bhatta et al. [30]			aOR (95 % CI)
	1 Sexual abuse	1 Suicidal ideation	2.75 (2.08–3.63)
		2 Suicide attempt	3.01 (2.22–4.08)
	2 Homelessness		1.51 (1.17–1.94)
			1.49 (1.12–1.98)
	3 Running away from home		1.20 (0.95–1.51)
			1.38 (1.06–1.81)
	4 Drug use in the family		1.05 (0.79–1.39)
			1.26 (0.92–1.73)
Horesh et al. [31]			F or Z; post hoc Scheffe analysis
	1 Deaths (of first-degree relatives)	Suicide attempt of subjects with MDD, BPD vs. controls	7.03; MDD > BPD ($p < 0.05$)
	2 Lifetime losses (of other relatives, friends; separations)		0.98 (NS)
	3 Childhood sexual abuse		12.64; BPD > MDD ($p < 0.05$)
	4 Childhood physical abuse		1.43 (NS)
Johnson et al. [18]	Type of childhood adversity		aOR (95 % CI)
	1 Childhood injury or illness	Suicide attempt	0.60 (0.14–2.61)
	2 Disabling parental injury or illness		1.19 (0.27–5.25)
	3 High level of violence in school		3.53 (1.52–8.19)
	4 High level of peer aggression		2.07 (0.59–7.24)
	5 Parental separation or divorce		1.20 (0.48–2.97)
	6 Raised by a single parent		1.31 (0.48–3.61)
	Type or maladaptive parental behavior or childhood maltreatment		
	1 Harsh parental punishment		3.37 (1.34–8.48)
	2 Maternal possessiveness		4.25 (1.36–13.28)
	3 Maternal use of guilt to control behavior		2.95 (1.12–7.73)
	4 Maternal verbal abuse		3.66 (1.39–9.65)
	5 Poor paternal communication		2.71 (1.15–6.40)
	6 Poor paternal fulfillment of the paternal role		2.88 (1.15–7.20)
	7 Physical childhood abuse		5.10 (1.78–14.64)
	8 Sexual childhood abuse		7.22 (2.22–23.53)
	Negative life events at the age of 16 years		
	1 Death of loved one		1.37 (0.59–3.15)
	2 Parental separation or divorce		1.50 (0.34–6.63)
	3 Relationship breakup or rejection		2.64 (1.14–6.11)
	4 Serious fights with family members		3.08 (1.32–7.19)
	5 Serious financial problems		3.08 (1.32–7.19)
	6 Serious problems at school or work		1.83 (0.70–4.74)
	7 Severe injury or illness		0.52 (0.11–2.24)
	8 Trouble with the low		2.36 (0.77–7.21)
	Interpersonal difficulty at the age of 16 years		
	1 Loneliness and interpersonal isolation		3.55 (1.46–8.64)
	2 No close friends		3.96 (1.50–10.49)
	3 Poor relationships with friends and peers		4.92 (1.72–14.05)

Table 4 continued

References	Life adversities: adverse life events	Suicidal outcomes	Statistics
Kaplow et al. [29]			Regression coefficients (*p* value)
	1 Adverse life events	1 Suicidal ideation	0.20 ($p < 0.01$)
		2 Suicide attempt	0.29 ($p < 0.01$)
	2 Emotional suppression		0.10 ($p < 0.01$)
			0.11 ($p < 0.01$)
King et al. [27]			aOR (95 % CI)
	1 Serious physical fights vs. none	Suicidal ideation or suicide attempt (suicide risk)	1.8 (1.03–3.0)
	2 Sexual experience with someone ever (present vs. absent)		2.1 (1.1–4.0)
	3 Number of times drunk in the past 6 months (2–10+)		2.1 (0.9–4.8)
Liu and Tein [28]	Life events (number of)*		aOR (95 % CI)
	1 0–3	1 Suicidal ideation	1.00
		2 Suicide attempt	1.00
	2 4–6		1.18 (0.75–1.86)
			2.25 (1.23–4.12)
	3 7–9		1.28 (0.79–2.02)
			2.02 (1.03–3.96)
	4 >9		1.66 (0.94–2.92)
			2.50 (1.02–6.10)
McKeown et al. [26]			aOR (95 % CI)
	1 Undesirable life events	1 Suicide attempt	1.03 (0.88–1.21)
	2 Low cohesion	2 Suicide plan	0.90 (0.86–0.95)
		3 Suicidal ideation	1.09 (1.01–1.18)
			0.99 (0.93–1.04)
			1.06 (0.96–1.17)
			1.00 (0.95–1.04)
Nrugham et al. [21]			OR (95 % CI)
	1 Violent traumatic event	Suicide attempt	3.8 (2.1–6.8)
	2 Being victim of a violent life event by age of 20		5.5 (3.0–10.1)
Stone et al. [24]			aOR (95 % CI)
	1 Childhood sexual abuse	Suicide events	1.19 (1.00–1.42)
Thompson et al. [23]			aOR (95 % CI)
	1 Low childhood** adversities	Suicidal ideation	0.81 (0.62–1.06)
	2 Medium childhood adversities		1.43 (1.08–1.89)
	3 Low adolescence$^{\neq}$ adversities		0.93 (0.70–1.24)
	4 Medium adolescence adversities		1.47 (0.81–2.69)
	5 High adolescence adversities		2.57 (1.98–3.54)
References	Life adversities: maltreatment	Suicidal outcomes	Statistics
Bensley et al. [34]			aOR (95 % CI)
	1 Abuse + molestation	1 Suicidal thoughts	4.4 (3.1–6.2)
	2 Molestation	2 Suicide plan	6.8 (4.4–10.4)
	3 Physical abuse	3 Non-injurious suicide attempt	12.0 (7.9–18.4)
			47.1 (23.3–95.3)
		4 Injurious suicide attempt	1.9 (1.2–2.8)
			3.9 (2.2–6.7)
			2.7 (1.5–4.8)
			11.6 (3.2–42.3)
			2.3 (1.7–3.2)
			3.1 (2.1–4.6)
			5.1 (3.3–7.8)
			11.8 (4.4–31.9)

Table 4 continued

References	Life adversities: maltreatment	Suicidal outcomes	Statistics
Bhatta et al. [30]			aOR (95 % CI)
	1 Sexual abuse	1 Suicidal ideation	2.75 (2.08–3.63)
	2 Homelessness	2 Suicide attempt	3.01 (2.22–4.08)
	3 Running away from home		1.51 (1.17–1.94)
	4 Drug use in the family		1.49 (1.12–1.98)
			1.20 (0.95–1.51)
			1.38 (1.06–1.81)
			1.05 (0.79–1.39)
			1.26 (0.92–1.73)
Brezo et al. [20]			aOR (95 % CI)
	1 Childhood physical abuse	1 Single attempt	2.0 (1.2–3.2)
	2 Childhood sexual abuse	2 Repeated attempts	1.9 (1.1–3.5)
	3 Both sexual and physical abuse in childhood	3 Early onset attempt	4.7 (2.7–8.1)
		4 Late-onset attempt	2.4 (1.0–5.9)
		5 Transient ideation	–
		6 Persistent ideation	13.8 (6.6–29.0)
			1.9 (1.0–3.6)
			–
			4.7 (2.5–8.9)
			2.2 (1.2–4.0)
			2.9 (1.5–5.7)
			9.0 (5.0–16.0)
			1.7 (1.2–2.4)
			2.2 (1.4–3.4)
			2.7 (1.6–4.5)
			1.9 (1.2–3.1)
			3.2 (1.9–5.3)
			5.9 (3.4–10.0)
Horesh et al. [31]			F or Z; post hoc Scheffe analysis
	1 Deaths (of first-degree relatives)	Suicide attempt of subjects with MDD, BPD vs. controls	7.03; MDD > BPD ($p < 0.05$)
	2 Lifetime losses (of other relatives, friends; separations)		0.98 (NS)
	3 Childhood sexual abuse		12.64; BPD > MDD ($p < 0.05$)
	4 Childhood physical abuse		1.43 (NS)
Johnson et al. [18]	Type of childhood adversity		aOR (95 % CI)
	1 Childhood injury or illness	Suicide attempt	0.60 (0.14–2.61)
	2 Disabling parental injury or illness		1.19 (0.27–5.25)
	3 High level of violence in school		3.53 (1.52–8.19)
	4 High level of peer aggression		2.07 (0.59–7.24)
	5 Parental separation or divorce		1.20 (0.48–2.97)
	6 Raised by a single parent		1.31 (0.48–3.61)
	Type or maladaptive parental behavior or childhood maltreatment		
	1 Harsh parental punishment		3.37 (1.34–8.48)
	2 Maternal possessiveness		4.25 (1.36–13.28)
	3 Maternal use of guilt to control behavior		2.95 (1.12–7.73)
	4 Maternal verbal abuse		3.66 (1.39–9.65)
	5 Poor paternal communication		2.71 (1.15–6.40)
	6 Poor paternal fulfillment of the paternal role		2.88 (1.15–7.20)
	7 Physical childhood abuse		5.10 (1.78–14.64)
	8 Sexual childhood abuse		7.22 (2.22–23.53)
	Negative life events at the age of 16 years		
	1 Death of loved one		1.37 (0.59–3.15)
	2 Parental separation or divorce		1.50 (0.34–6.63)

Table 4 continued

References	Life adversities: maltreatment	Suicidal outcomes	Statistics	
	3 Relationship breakup or rejection		2.64 (1.14–6.11)	
	4 Serious fights with family members		3.08 (1.32–7.19)	
	5 Serious financial problems		3.08 (1.32–7.19)	
	6 Serious problems at school or work		1.83 (0.70–4.74)	
	7 Severe injury or illness		0.52 (0.11–2.24)	
	8 Trouble with the low		2.36 (0.77–7.21)	
	Interpersonal difficulty at the age of 16 years			
	1 Loneliness and interpersonal isolation		3.55 (1.46–8.64)	
	2 No close friends		3.96 (1.50–10.49)	
	3 Poor relationships with friends and peers		4.92 (1.72–14.05)	
Kaplan et al. [37]			Proportion (*p* value)	
	Family stressors	Suicide attempt		
	1 <2 biological parents in home		0.75 (NS)	
	Personal stressors			
	2 >1 death or separation		0.25 (NS)	
King et al. [27]			aOR (95 % CI)	
	1 Serious physical fights vs. none	Suicidal ideation or suicide attempt (suicide risk)	1.8 (1.03–3.0)	
	2 Sexual experience with someone ever (present vs. absent)		2.1 (1.1–4.0)	
	3 Number of times drunk in the past 6 months (2–10+)		2.1 (0.9–4.8)	
Lipschitz et al. [39]			χ^2; estimate; *p* value	
	1 CTQ sexual abuse	1 Suicide attempt	5.76, 0.09; 0.01;	
	2 CTQ emotional neglect	2 Self-mutilation	4.17; 0.05; 0.04;	
		3 Suicidal ideation	6.53; 0.01; 0.01;	
			7.93; 0.08; 0.005	
			t and *p* values:	
			3.07, 0.003	
			2.93; 0.004	
Martin et al. [17]			aOR (95 % CI)	
	1 Sexual abuse	1 Suicidal ideas	Boys	Girls
	2 Distress—low	2 Suicide plans	5.0 (1.5–16.8)	NS
	3 Distress—high	3 Suicidal threats	NS	NS
		4 Suicidal self-injury	7.4 (1.7–31.8)	3.3 (1.1–10.2)
		5 Suicide attempt	10.6 (3.5–32.7)	NS
			NS	NS
			13.3 (3.6–49.6)	2.7 (1.2–6.3)
			10.9 (3.9–30.4)	NS
			10.4 (1.4–77.3)	NS
			11.1 (3.4–35.7)	NS
			4.3 (1.5–12.6)	NS
			NS	NS
			4.8 (1.4–16.6)	NS
			15.0 (4.7–47.9)	NS
			NS	NS
			18.7 (5.0–70.1)	NS
Rew et al. [33]			Pearson χ^2 (*p* value)	
	1 Sexual abuse	1 Considered suicide (M/F)	4.892 (0.087) (NS)	
		2 Planned suicide (M/F)	2.552 (0.279) (NS)	
		3 Attempted suicide (M/F)	5.998 (0.199) (NS)	
		4 Suicide attempt required medical treatment (M/F)	11.074 (0.026)	

Table 4 continued

References	Life adversities: maltreatment	Suicidal outcomes	Statistics
Rhodes et al. [32]			aRR (95 % CI)
	1 Substantiated maltreatment	Repeated ED presentation for SRB	2.0 (1.59–2.53)
Salzinger et al. [38]			aOR (95 % CI)
	1 Preadolescent physical abuse	1 Suicidal ideation	4.36 (1.64–11.60)
	2 Parental verbal and physical abuse	2 Suicide attempt	6.78 (1.89–24.37)
	3 Youth life events		1.32 (1.12–1.56)
	4 Household events		1.30 (1.09–1.56)
			1.12 (0.96–1.30)
			1.04 (0.87–1.25)
			1.07 (0.98–1.18)
			1.06 (0.95–1.17)
Stone et al. [24]			aOR (95 % CI)
	1 Childhood sexual abuse	Suicide events	1.19 (1.00–1.42)
Tanaka et al. [22]			AR2 (*p* value)
	1 CTQ emotional abuse subscale	Lower self-compassion associated with a serious suicide attempt	0.137 (0.007)
	2 CTQ physical abuse subscale		0.130 (0.862)
	3 CTQ emotional neglect subscale		0.122 (8.95)

References	Life adversities: parental death, parental divorce, or negative family climate	Suicidal outcomes	Statistics
Jakobsen and Christiansen [40]	Parental death		RR (95 % CI)
	1 One dead biological parent	Suicide attempt	1.71 (1.49–1.96)
	2 Two dead biological parents		4.66 (2.55–8.52)
	3 Biological mother dead		1.85 (1.47–2.31)
	4 Biological father dead		1.77 (1.52–2.07)
	Time since parental death		
	1 1 year		2.19 (1.52–3.16)
	2 2–5 years		1.92 (1.49–2.47)
	Cause of parental death		
	1 Suicide		2.70 (1.81–4.04)
	2 Homicide or violence		2.38 (1.34–4.23)
Johnson et al. [18]	Type of childhood adversity		aOR (95 % CI)
	1 Childhood injury or illness	Suicide attempt	0.60 (0.14–2.61)
	2 Disabling parental injury or illness		1.19 (0.27–5.25)
	3 High level of violence in school		3.53 (1.52–8.19)
	4 High level of peer aggression		2.07 (0.59–7.24)
	5 Parental separation or divorce		1.20 (0.48–2.97)
	6 Raised by a single parent		1.31 (0.48–3.61)
	Type or maladaptive parental behavior or childhood maltreatment		
	1 Harsh parental punishment		3.37 (1.34–8.48)
	2 Maternal possessiveness		4.25 (1.36–13.28)
	3 Maternal use of guilt to control behavior		2.95 (1.12–7.73)
	4 Maternal verbal abuse		3.66 (1.39–9.65)
	5 Poor paternal communication		2.71 (1.15–6.40)
	6 Poor paternal fulfillment of the paternal role		2.88 (1.15–7.20)
	7 Physical childhood abuse		5.10 (1.78–14.64)
	8 Sexual childhood abuse		7.22 (2.22–23.53)
	Negative life events at the age of 16 years		
	1 Death of loved one		1.37 (0.59–3.15)
	2 Parental separation or divorce		1.50 (0.34–6.63)
	3 Relationship breakup or rejection		2.64 (1.14–6.11)
	4 Serious fights with family members		3.08 (1.32–7.19)
	5 Serious financial problems		3.08 (1.32–7.19)

Table 4 continued

References	Life adversities: parental death, parental divorce, or negative family climate	Suicidal outcomes	Statistics
	6 Serious problems at school or work		1.83 (0.70–4.74)
	7 Severe injury or illness		0.52 (0.11–2.24)
	8 Trouble with the low		2.36 (0.77–7.21)
	Interpersonal difficulty at the age of 16 years		
	1 Loneliness and interpersonal isolation		3.55 (1.46–8.64)
	2 No close friends		3.96 (1.50–10.49)
	3 Poor relationships with friends and peers		4.92 (1.72–14.05)
King et al. [27]			aOR (95 % CI)
	1 Serious physical fights vs. none	Suicidal ideation or suicide attempt (suicide risk)	1.8 (1.03–3.0)
	2 Sexual experience with someone ever (present vs. absent)		2.1 (1.1–4.0)
	3 Number of times drunk in the past 6 months (2–10+)		2.1 (0.9–4.8)
Liu and Tein [28]	Life events (number of)*		aOR (95 % CI)
	1 0–3	1 Suicidal ideation	1.00
		2 Suicide attempt	1.00
	2 4–6		1.18 (0.75–1.86)
			2.25 (1.23–4.12)
	3 7–9		1.28 (0.79–2.02)
			2.02 (1.03–3.96)
	4 >9		1.66 (0.94–2.92)
			2.50 (1.02–6.10)
McKeown et al. [26]			aOR (95 % CI)
	1 Undesirable life events	1 Suicide attempt	1.03 (0.88–1.21)
	2 Low cohesion	2 Suicide plan	0.90 (0.86–0.95)
		3 Suicidal ideation	1.09 (1.01–1.18)
			0.99 (0.93–1.04)
			1.06 (0.96–1.17)
			1.00 (0.95–1.04)
Wilcox et al. [41]			IRR (95 % CI)
	1 Parental suicide during childhood	Suicide risk	3.0 (1.7–5.3)
	2 Parental suicide during adolescence		3.1 (2.1–4.6)
	3 Parental accidental death during childhood		2.0 (1.1–3.8)
	4 Parental accidental death during adolescence		1.1 (0.6–2.2) (NS)
Xing et al. [42]			aOR (95 % CI)
	1 Factor 1 (improper parental rearing behavior)	Suicide attempt	1.76 (1.59, 1.95)
	2 Factor 2 (separation from parents)		1.30 (1.22, 1.40)
	3 Factor 3 (social problems of family members)		1.25 (1.15, 1.35)
	4 Factor 4 (poor material conditions in family)		–
	5 Factor 5 (family member's adversity)		–

References	Life adversities: school/interpersonal problems	Suicidal outcomes	Statistics
Baldry et al. [43]			*B* and (*t*) values
	1 SES	Suicidal cognition	0.015 (0.42) (NS)
	2 Harm from the father		0.155 (3.69)
	3 Relational victimization in school		0.146 (3.87)
	4 Harm from the mother X gender		0.112 (2.82)
Johnson et al. [18]	Type of childhood adversity		aOR (95 % CI)
	1 Childhood injury or illness	Suicide attempt	0.60 (0.14–2.61)
	2 Disabling parental injury or illness		1.19 (0.27–5.25)
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Table 4 continued

References	Life adversities: school/interpersonal problems	Suicidal outcomes	Statistics
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	3 7–9		1.28 (0.79–2.02)
			2.02 (1.03–3.96)
	4 >9		1.66 (0.94–2.92)
			2.50 (1.02–6.10)

BPD borderline personality disorder, *CTQ* Childhood Trauma Questionnaire, *ED* emergency department, *MDD* major depressive disorder, *M*/*F* male/female, *NS* not significant, *SES* socio-economic status, *SRB* suicide-related behavior

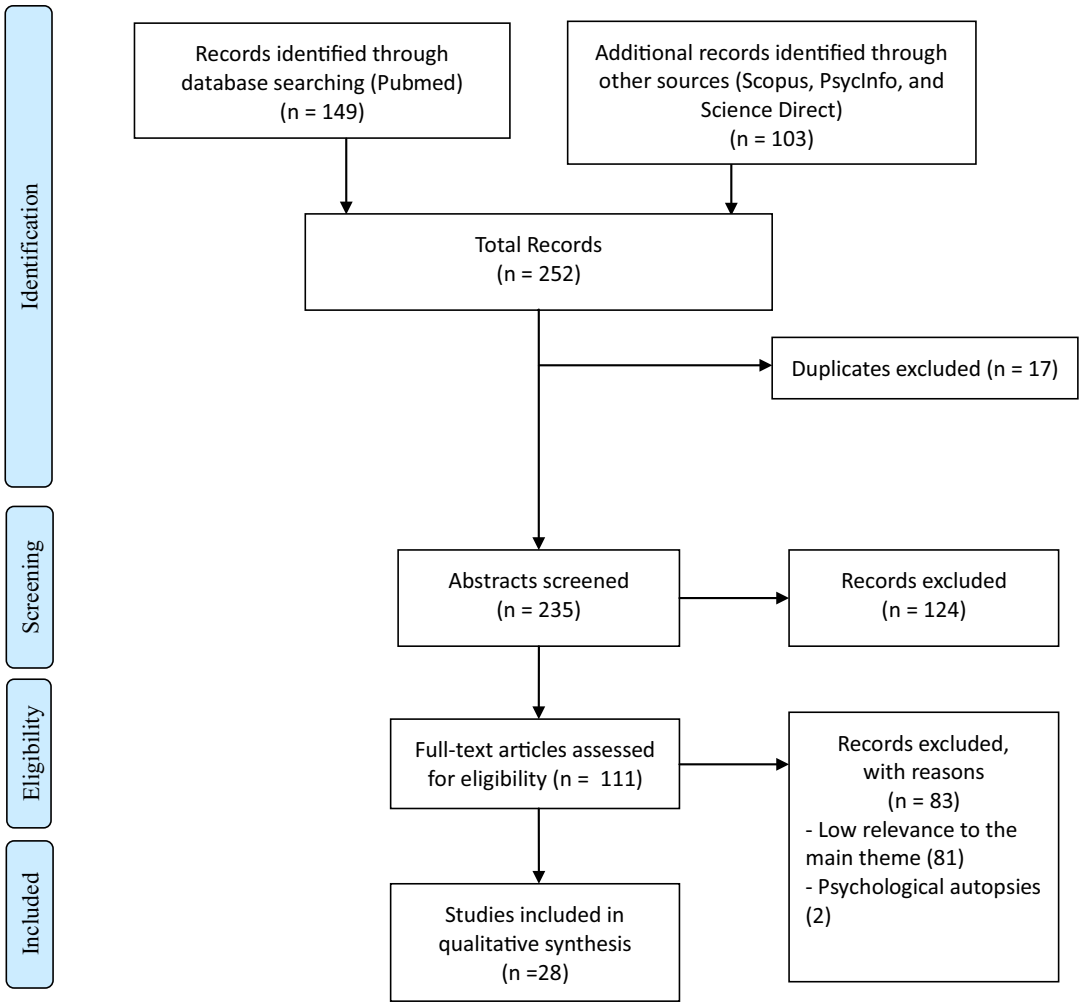
* Individual negative life events were not reported

** Childhood adversities included physical abuse, neglect, family violence, and residential instability

≠ Adversities during adolescence included physical abuse, sexual abuse, psychological maltreatment, and non-family violence

Main limitations

Our review should be considered in the light of several limitations. First, we could not carry out a meta-analysis because our studies included different life events and different outcomes. Also, although our review aimed to summarize systematically the most relevant studies in the field, their inclusion and exclusion may reflect our choice, on the basis of our expertise. Moreover, some studies had small sample sizes and small numbers of suicide ideators or attempters, and, as a result, reduced statistical power. In addition, studies did not always distinguish between suicidal ideation and suicide attempts. Also, most of our studies had adopted retrospective designs, and thus findings may have been hampered by recall bias. Finally, some of our studies recruited heterogeneous samples, included a relatively small number of events, or did not include control groups.



From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). *P*referred *R*eporting *I*tems for *S*ystematic Reviews and *M*eta-*A*nalyses: The PRISMA Statement. PLoS Med 6(6): e1000097. doi:10.1371/journal.pmed1000097

Fig. 1 Flowchart of the search and selection process

Implications and future directions

Most of the studies included in the present review reported a positive, statistically significant association between life adversities, and suicidality in young people. There seemed to be a strong, positive dose–response relationship between number of events experienced and risk of youth suicidal behavior. While the number of events was significant, their type and timing also mattered. Exposure to adversities (in particular sexual abuse/molestation) during vulnerable periods of life may be a critical risk factor for the emergence of suicidal behavior in adolescence and early adulthood. Future studies should elucidate the extent and type of the association between adverse experiences and risk of suicide in youth.

Compliance with ethical standards

Conflicts of interest The authors declare no conflicts of interest regarding this manuscript.

References

1. Dahl RE (2004) Adolescent brain development: a period of vulnerabilities and opportunities. Keynote address. Ann N Y Acad Sci 1021:1–22
2. Fine JG, Sung C (2014) Neuroscience of child and adolescent health development. J Couns Psychol 61:521–527
3. Felitti VJ, Anda RF, Nordenberg D, Williamson DF, Spitz AM, Edwards V, Koss MP, Marks JS (1998) Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults. The Adverse Childhood Experiences (ACE) Study. Am J Prev Med 14:245–258

4. Danese A, McEwen BS (2012) Adverse childhood experiences, allostasis, allostatic load, and age-related disease. Physiol Behav 106:29–39
5. Oldehinkel AJ, Ormel J (2014) A longitudinal perspective on childhood adversities and onset risk of various psychiatric disorders. Eur Child Adolesc Psychiatry. doi:10.1007/s00787-014-0540-0 **(in press)**
6. Schilling EA, Aseltine RH Jr, Gore S (2007) Adverse childhood experiences and mental health in young adults: a longitudinal survey. BMC Public Health 7:30
7. Varese F, Smeets F, Drukker M, Lieverse R, Lataster T, Viechtbauer W, Read J, van Os J, Bentall RP (2012) Childhood adversities increase the risk of psychosis: a meta-analysis of patient-control, prospective- and cross-sectional cohort studies. Schizophr Bull 38:661–671
8. Brodsky BS, Stanley B (2008) Adverse childhood experiences and suicidal behavior. Psychiatr Clin North Am 31:223–235
9. WHO (2014) Health for the world's adolescents. A second chance in the second decade. Available at: http://apps.who.int/adolescent/second-decade. Accessed 11 Dec 2014
10. Flaherty EG, Thompson R, Dubowitz H, Harvey EM, English DJ, Proctor LJ, Runyan DK (2013) Adverse childhood experiences and child health in early adolescence. JAMA Pediatr 167:622–629
11. Tamayo T, Christian H, Rathmann W (2010) Impact of early psychosocial factors (childhood socioeconomic factors and adversities) on future risk of type 2 diabetes, metabolic disturbances and obesity: a systematic review. BMC Public Health 10:525
12. Hawton K, Saunders KE, O'Connor RC (2012) Self-harm and suicide in adolescents. Lancet 379:2373–2382
13. Miller AB, Esposito-Smythers C, Weismoore JT, Renshaw KD (2013) The relation between child maltreatment and adolescent suicidal behavior: a systematic review and critical examination of the literature. Clin Child Fam Psychol Rev 16:146–172
14. Teicher MH, Samson JA (2013) Childhood maltreatment and psychopathology: a case for ecophenotypic variants as clinically and neurobiologically distinct subtypes. Am J Psychiatry 170:1114–1133
15. Santa Mina EE, Gallop RM (1998) Childhood sexual and physical abuse and adult self-harm and suicidal behaviour: a literature review. Can J Psychiatry 43:793–800
16. Molnar BE, Berkman LF, Buka SL (2001) Psychopathology, childhood sexual abuse and other childhood adversities: relative links to subsequent suicidal behaviour in the US. Psychol Med 31:965–977
17. Martin G, Bergen HA, Richardson AS, Roeger L, Allison S (2004) Sexual abuse and suicidality: gender difference in a large community sample of adolescents. Child Abuse Negl 28:491–503
18. Johnson JG, Cohen P, Gould MS, Kasen S, Brown J, Brook JS (2002) Childhood adversities, interpersonal difficulties, and risk for suicide attempts during late adolescence and early adulthood. Arch Gen Psychiatry 59:741–749
19. Roberts TA, Klein JD, Fisher S (2003) Longitudinal effect of intimate partner abuse on high-risk behavior among adolescents. Arch Pediatr Adolesc Med 157:875–881
20. Brezo J, Paris J, Vitaro F, Hébert M, Tremblay RE, Turecki G (2008) Predicting suicide attempts in young adults with histories of childhood abuse. Br J Psychiatry 193:134–139
21. Nrugham L, Holen A, Sund AM (2010) Associations between attempted suicide, violent life events, depressive symptoms, and resilience in adolescents and young adults. J Nerv Ment Dis 198:131–6. Erratum in: J Nerv Ment Dis 198:389
22. Tanaka M, Wekerle C, Schmuck ML, Paglia-Boak A, MAP Research Team (2011) The linkages among childhood maltreatment, adolescent mental health, and self-compassion in child welfare adolescents. Child Abuse Negl 35:887–898
23. Thompson R, Litrownik AJ, Isbell P, Everson MD, English DJ, Dubowitz H, Proctor LJ, Flaherty EG (2012) Adverse experiences and suicidal ideation in adolescence: exploring the link using the LONGSCAN samples. Psychol Violence 2. doi:10.1037/a0027107
24. Stone LB, Liu RT, Yen S (2014) Adolescent inpatient girls′ report of dependent life events predicts prospective suicide risk. Psychiatry Res 219:137–142
25. Moher D, Liberati A, Tetzlaff J, Mulrow C, Gøtzsche PC, Ioannidis JP, Clarke M, Devereaux PJ, Kleijnen J, Moher D (2009) The Prisma statement for reporting systematic reviews and meta-analyses of studies that evaluate healthcare interventions: explanation and elaboration. BMJ 339:b2700
26. McKeown RE, Garrison CZ, Cuffe SP, Waller JL, Jackson KL, Addy CL (1998) Incidence and predictors of suicidal behaviors in a longitudinal sample of young adolescents. J Am Acad Child Adolesc Psychiatry 37:612–619
27. King RA, Schwab-Stone M, Flisher AJ, Greenwald S, Kramer RA, Goodman SH, Lahey BB, Shaffer D, Gould MS (2001) Psychosocial and risk behavior correlates of youth suicide attempts and suicidal ideation. J Am Acad Child Adolesc Psychiatry 40:837–846
28. Liu X, Tein JY (2005) Life events, psychopathology, and suicidal behavior in Chinese adolescents. J Affect Disord 86:195–203
29. Kaplow JB, Gipson PY, Horwitz AG, Burch BN, King CA (2014) Emotional suppression mediates the relation between adverse life events and adolescent suicide: implications for prevention. Prev Sci 15:177–185
30. Bhatta MP, Jefferis E, Kavadas A, Alemagno SA, Shaffer-King P (2014) Suicidal behaviors among adolescents in juvenile detention: role of adverse life experiences. PLoS One 9:e89408
31. Horesh N, Nachshoni T, Wolmer L, Toren P (2009) A comparison of life events in suicidal and nonsuicidal adolescents and young adults with major depression and borderline personality disorder. Compr Psychiatry 50:496–502
32. Rhodes AE, Boyle MH, Bethell J, Wekerle C, Tonmyr L, Goodman D, Leslie B, Lam K, Manion I (2013) Child maltreatment and repeat presentations to the emergency department for suicide-related behaviors. Child Abuse Negl 37:139–149
33. Rew L, Taylor-Seehafer M, Fitzgerald ML (2001) Sexual abuse, alcohol and other drug use, and suicidal behaviors in homeless adolescents. Issues Compr Pediatr Nurs 24:225–240
34. Bensley LS, Van Eenwyk J, Spieker SJ, Schoder J (1999) Self-reported abuse history and adolescent problem behaviors I. Antisocial and suicidal behaviors. J Adolesc Health 24:163–172
35. Blosnich J, Bossarte R (2012) Drivers of disparity: differences in socially based risk factors of self-injurious and suicidal behaviors among sexual minority college students. J Am Coll Health 60:141–149
36. Muehlenkamp JJ, Gutierrez PM (2004) An investigation of differences between self-injurious behavior and suicide attempts in a sample of adolescents. Suicide Life Threat Behav 34:12–23
37. Kaplan SJ, Pelcovitz D, Salzinger S, Mandel F, Weiner M (1997) Adolescent physical abuse and suicide attempts. J Am Acad Child Adolesc Psychiatry 36:799–808
38. Salzinger S, Rosario M, Feldman RS, Ng-Mak DS (2007) Adolescent suicidal behavior: associations with preadolescent physical abuse and selected risk and protective factors. J Am Acad Child Adolesc Psychiatry 46:859–866
39. Lipschitz DS, Winegar RK, Nicolaou AL, Hartnick E, Wolfson M, Southwick SM (1999) Perceived abuse and neglect as risk factors for suicidal behavior in adolescent inpatients. J Nerv Ment Dis 187:32–39
40. Jakobsen IS, Christiansen E (2011) Young people's risk of suicide attempts in relation to parental death: a population-based register study. J Child Psychol Psychiatry 52:176–183

41. Wilcox HC, Kuramoto SJ, Lichtenstein P, Långström N, Brent DA, Runeson B (2010) Psychiatric morbidity, violent crime, and suicide among children and adolescents exposed to parental death. J Am Acad Child Adolesc Psychiatry 49:514–523; quiz 530. Erratum in: J Am Acad Child Adolesc Psychiatry 49:858–859
42. Xing XY, Tao FB, Wan YH, Xing C, Qi XY, Hao JH, Su PY, Pan HF, Huang L (2010) Family factors associated with suicide attempts among Chinese adolescent students: a national cross-sectional survey. J Adolesc Health 46:592–599
43. Baldry AC, Winkel FW (2003) Direct and vicarious victimization at school and at home as risk factors for suicidal cognition among Italian adolescents. J Adolesc 26:703–716
44. Laederach J, Fischer W, Bowen P, Ladame F (1999) Common risk factors in adolescent suicide attempters revisited. Crisis 20:15–22
45. Deykin EY, Alpert JJ, McNamarra JJ (1985) A pilot study of the effect of exposure to child abuse or neglect on adolescent suicidal behavior. Am J Psychiatry 142:1299–1303
46. Plunkett A, O'Toole B, Swanston H, Oates RK, Shrimpton S, Parkinson P (2001) Suicide risk following child sexual abuse. Ambul Pediatr 1:262–266
47. Riggs S, Alario AJ, McHorney C (1990) Health risk behaviors and attempted suicide in adolescents who report prior maltreatment. J Pediatr 116:815–821
48. Brent DA, Greenhill LL, Compton Emslie G, Wells K, Walkup JT, Vitiello B, Bukstein O, Stanley B, Posner K, Kennard BD, Cwik MF, Wagner A, Coffey B, March JS, Riddle M, Goldstein T, Curry J, Barnett S, Capasso L, Zelazny J, Hughes J, Shen S, Gugga SS, Turner JB (2009) The Treatment of Adolescent Suicide Attempters study (TASA): predictors of suicidal events in an open treatment trial. J Am Acad Child Adolesc Psychiatry 48:987–996
49. Evans E, Hawton K, Rodham K (2005) Suicidal phenomena and abuse in adolescents: a review of epidemiological studies. Child Abuse Negl 29:45–58
50. Beautrais AL (2000) Risk factors for suicide and attempted suicide among young people. Aust N Z J Psychiatry 34:420–436
51. Keiley MK, Howe TR, Dodge KA, Bates JE, Pettit GS (2001) The timing of child physical maltreatment: a cross-domain growth analysis of impact on adolescent externalizing and internalizing problems. Dev Psychopathol 13:891–912
52. Kaplow JB, Widom CS (2007) Age of onset of child maltreatment predicts long-term mental health outcomes. J Abnorm Psychol 116:176–187
53. Thornberry TP, Henry KL, Ireland TO, Smith CA (2010) The causal impact of childhood-limited maltreatment and adolescent maltreatment on early adult adjustment. J Adolesc Health 46:359–365
54. Dunn EC, McLaughlin KA, Slopen N, Rosand J, Smoller JW (2013) Developmental timing of child maltreatment and symptoms of depression and suicidal ideation in young adulthood: results from the National Longitudinal Study of Adolescent Health. Depress Anxiety 30:955–964
55. Bifulco A, Brown GW, Moran P, Ball C, Campbell C (1998) Predicting depression in women: the role of past and present vulnerability. Psychol Med 28:39–50
56. Weiss MJS, Wagner SH (1998) What explains the negative consequences of adverse childhood experiences on adult health? Am J Prev Med 14:356–360
57. Green AH, Voeller K, Gaines RW, Kubie J (1981) Neurological impairment in maltreated Children. Child Abuse Negl 5:129–134
58. Perry BD, Pollard RA, Blakely TL, Baker WL, Vigilante D (1995) Childhood trauma, the neurobiology of adaptation and use-dependent development of the brain: how states become traits. Infant Ment Health J 16:271–291
59. Van der Kolk BA, Fisler RE (1994) Childhood abuse and neglect and loss of self-regulation. Bull Menninger Clin 58:145–168
60. Pollak SD, Vardi S, Putzer Bechner A, Curtin JJ (2005) Physically abused children's regulation of attention in response to hostility. Child Dev 76:968–977
61. McCrory E, DeBrito SA, Viding E (2010) Research review: the neurobiology and genetics of maltreatment and adversity. J Child Psychol Psychiatry 51:1079–1095
62. Perry BD, Pollard R (1998) Homeostasis, stress, trauma, and adaptation-a neurodevelopmental view of childhood trauma. Child Adolesc Psychiatr Clin N Am 7:33–51
63. DeBellis MD, Baum AS, Birmaher B, Keshavan MS, Eccard CH, Boring AM, Jenkins FJ, Ryan ND, A.E. Bennett Research Award (1999) Developmental traumatology part I. Biological stress systems. Biol Psychiatry 45:1259–1270
64. Kleiman EM, Riskind JH, Schaefer KE (2014) Social support and positive events as suicide resiliency factors: examination of synergistic buffering effects. Arch Suicide Res 18:144–155
65. Johnson J, Wood AM, Gooding P, Taylor PJ, Tarrier N (2011) Resilience to suicidality: the buffering hypothesis. Clin Psychol Rev 31:563–591