

# Prevalence and Correlates of Suicide and Nonsuicidal Self-injury in Children

## A Systematic Review and Meta-analysis

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[+ Supplemental content](#)

**IMPORTANCE** Considerably less is known about self-injurious thoughts and behaviors (SITBs) in preadolescence than older age groups, owing partly to the common view that young children are incapable of suicidal thoughts. Yet, preadolescent suicide has increased in recent years and is now the fifth leading cause of death in this age group, leading the National Institute of Mental Health to identify it as a priority for research and intervention.

**OBJECTIVE** To assess prevalence estimates of preadolescent SITBs, identify correlates of these outcomes, and conduct head-to-head comparisons of preadolescent and adolescent SITBs in terms of associated characteristics.

**DATA SOURCES** MEDLINE, PsycINFO, and Embase were systematically searched from inception through December 23, 2021, for studies on the prevalence and correlates of preadolescent SITBs. The search was restricted to English language publications and peer-reviewed journals.

**STUDY SELECTION** Two reviewers independently identified studies providing data on prevalence and correlates of preadolescent SITBs.

**DATA EXTRACTION AND SYNTHESIS** Two reviewers independently extracted data from each study, and the Joanna Briggs Institute Checklist for Prevalence Studies was used to assess study quality. Pooled prevalence and Cohen  $d$  were derived from random-effects meta-analyses. Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) reporting guideline was followed.

**MAIN OUTCOMES AND MEASURES** Prevalence and correlates of suicidal ideation, suicide attempts, suicide deaths, and nonsuicidal self-injury among preadolescents.

**RESULTS** Fifty-eight studies with 626 486 590 individuals were included. Lifetime prevalence of suicide in the general population was 0.79 per 1 million children. Prevalence for lifetime suicidal thoughts, suicide attempts, and nonsuicidal self-injury among preadolescents were 15.1%, 2.6%, and 6.2%, respectively, in community samples. These data suggest that approximately 17.0% of preadolescents with suicidal ideation transition to attempting suicide. Across several analyses, male individuals appear more likely to have SITBs in preadolescence than adolescence. Correlate data were modest for SITBs other than suicidal ideation, but among specific disorders, attention-deficit/hyperactivity disorder (suicidal ideation:  $d = 0.54$  [95% CI, 0.34-0.75]) and depression (suicidal ideation:  $d = 0.90$  [95% CI, 0.71-1.09]; suicide attempts:  $d = 0.47$  [95% CI, 0.26-0.68]) emerged as the strongest correlates. Among interpersonal factors, child maltreatment (suicidal ideation:  $d = 2.62$  [95% CI, 1.56-3.67]) and parental support (suicidal ideation:  $d = -0.34$  [95% CI, -0.46 to -0.22]) yielded the largest effect sizes.

**CONCLUSIONS AND RELEVANCE** In this systematic review and meta-analysis, although preadolescent suicide deaths were rare, other SITB types occur with concerning frequency. Male individuals were at greater risk for SITBs in preadolescence relative to adolescence. Attention-deficit/hyperactivity disorder, child maltreatment, and parental support were especially relevant to suicidal ideation, as well as depression for suicidal thoughts and behaviors, in this age group. Further study, especially of SITBs other than suicidal ideation, is needed.

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Self-injurious thoughts and behaviors (SITBs) are a long-standing public health issue. Suicide is one of the leading causes of death worldwide.<sup>1</sup> Nonsuicidal self-injury (NSSI) has received increasing attention, in part because it is an even stronger predictor of future suicidal behavior than is a history of suicide attempts.<sup>2</sup> Identifying characteristics associated with SITBs is imperative for advancing strategies for preventing their occurrence. In contrast to the substantial number of studies focused on adolescents and adults, the amount of research on SITBs in preadolescent children (ie, age <13 years) is modest.<sup>3,4</sup> In the case of suicidal thoughts and behaviors, in some measure, this is due to the long-held view that preadolescent children do not possess the cognitive capability to comprehend the nature of death and so are incapable of thoughts or acts of suicide.<sup>5,6</sup> Research on NSSI in preadolescent children is rarer still, and this is in part a product of the later emergence of NSSI as a distinct field of inquiry in clinical research. This is important because findings on correlates of SITBs in older age groups may not fully generalize to preadolescents. Indeed, externalizing disorders have been viewed as of greater relevance to this younger age group,<sup>7,8</sup> but the strength of the evidence supporting this in the existing literature is unclear. Given that relatively little attention has been devoted to characterizing SITBs in preadolescent children, it is perhaps not surprising that studies on treatments for these clinical outcomes in this age group are all but nonexistent.<sup>4</sup>

With recent increases in suicide among preadolescent children in the US,<sup>3</sup> and with the role that suicidal ideation and NSSI have in this outcome, the need for progress in understanding the scope and nature of SITBs in this demographic is all the more pressing. Indeed, suicide emerged as the tenth leading cause of death among preadolescent children in 2008 and has continued to rise, becoming the fifth leading cause of death in 2019.<sup>9</sup> To address this worrying trend, the National Institute of Mental Health convened meetings in 2019<sup>10</sup> and 2021<sup>11</sup> to identify priorities and strategies for research on preadolescent suicide.

An important step toward this end is comprehensively to characterize the studies that have been conducted in this area. Although 2 recent overviews of preadolescent suicide exist,<sup>3,4</sup> to our knowledge, there has yet to be a systematic review conducted on SITBs. The current review aims to address this need by presenting the first systematic review and quantitative synthesis of the existing research on preadolescent SITBs. It aims to provide (1) prevalence estimates of SITBs among preadolescent children, thereby to characterize the scale of these clinical concerns; (2) an evaluation of potential moderators of lifetime prevalence of these clinical outcomes; (3) an assessment of sociodemographic, clinical, psychological, and other correlates of these outcomes; and (4) direct comparisons of preadolescent and adolescent SITBs in terms of available sociodemographic and other characteristics. Through providing a comprehensive synthesis characterizing the existing research on preadolescent SITBs, our goal is to provide a clear understanding of the current state of evidence on this topic, as well as a foundation to guide future research and ultimately to inform risk identification and intervention strategies.

## Key Points

**Question** What are the prevalence and correlates of preadolescent suicide and nonsuicidal self-injury?

**Findings** In this systematic review and meta-analysis of 58 studies, lifetime prevalence of suicidal ideation, suicide attempts, and nonsuicidal self-injury were 15.1%, 2.6%, and 6.2%, respectively, in community samples, and lifetime prevalence of suicide was 0.79 per 1 million children in the general population. Male sex, child maltreatment, attention-deficit/hyperactivity disorder, and depression were associated with risk, whereas parental support may be protective against suicidal ideation.

**Meaning** The prevalence of preadolescent suicidal thoughts and behaviors and nonsuicidal self-injury is concerning and underscores the need for additional research in this area.

## Methods

### Search Strategy and Eligibility Criteria

This project was registered in PROSPERO (CRD42021254670) and followed Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) reporting guideline. A systematic review of the literature was conducted in MEDLINE, PsycINFO, and Embase from inception through December 23, 2021 (search terms used are detailed in the eMethods in the Supplement). The literature search was restricted to English language and peer-reviewed journals. This was supplemented by a search of the references of an earlier review.<sup>12</sup>

Study inclusion criteria were (1) preadolescent SITBs (suicidal ideation, suicide attempts, suicide deaths, and NSSI) assessed in individuals younger than 13 years (ie, retrospective assessments of preadolescent SITBs in older samples were excluded); (2) SITBs were assessed systematically; (3) SITBs were assessed separately from each other and other constructs; and (4) quantitative data were presented on the prevalence (lifetime or current/past month) of preadolescent SITBs or their correlates. Studies were excluded if they (1) evaluated SITBs as adverse events in clinical trials and (2) assessed stereotypic self-harm in children with developmental disorders.

Each search result was reviewed by 2 or 4 independent coders (R.F.L.W., A.E.S., S.M.C., and C.M.S.) to determine eligibility. When eligibility could not be ruled out based on abstract and title alone, full-text review was conducted. In cases where more information was needed to determine study eligibility or for data extraction, detailed below, every effort was made to obtain further details in other publications describing the measure or study design (eg, other publications with the same data set) or by contacting the study authors, the latter of which resulted in additional prevalence data for 2 studies. Discrepancies in coding eligibility were resolved by the first author (R.T.L.).

### Data Extraction

Data on 7 study characteristics were extracted for analysis. These included 3 sample characteristics: (1) mean age of sample, (2) percentage of female participants in the sample,

and (3) sample type (community or clinical). Data for 4 study design characteristics were extracted: (1) SITB type assessed (ie, suicide, suicide attempts, suicidal ideation, and NSSI), (2) time frame covered by SITB assessment (lifetime or current/past month), (3) SITB measure type (questionnaire or interview), and (4) the respondent of the assessment (child, parent, or both). Correlate data for adolescent SITBs were extracted whenever possible for head-to-head comparisons between preadolescent and adolescent SITBs.

### Study Quality Assessment

Studies reporting lifetime prevalence of SITBs were assessed using the Joanna Briggs Institute Checklist for Prevalence Studies,<sup>13</sup> which includes 9 criteria for evaluating study quality. An overall study quality index was derived by summing the number of criteria met, with summed scores above 4 used as the criterion for high study quality.<sup>14</sup>

### Data Analysis

Analyses were conducted using Comprehensive Meta-Analysis version 3.3.070 (Biostat). The standardized mean difference (Cohen *d* based on the log odds ratio and its SD) was used as the indicator of effect size. Pooled associations were calculated such that values more than 0 reflected positive associations between the correlate of interest and SITBs. In head-to-head comparisons between preadolescent and adolescent SITBs with respect to a correlate of interest, values more than 0 indicated a correlate was more characteristic of preadolescent suicide. For correlates and head-to-head comparisons, analyses were conducted only when the number of unique associations of 3 or more, so as to obtain reliable pooled estimates of effect sizes.<sup>15</sup>

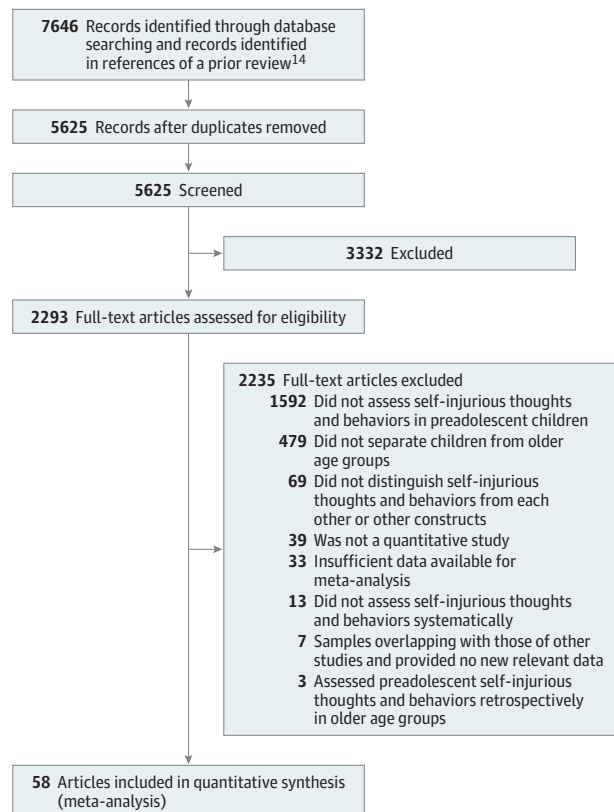
Random-effects models were generated, accounting for the high expected heterogeneity across studies resulting from differences in samples, measures, and design. Heterogeneity across the studies was evaluated using the  $I^2$  statistic,<sup>16</sup> which indicates the percentage of the variance in an effect estimate that is a product of heterogeneity across studies rather than sampling error (ie, chance). Substantial heterogeneity across studies is indicated by an  $I^2$  value of 75%. High heterogeneity indicates the need for moderator analyses to account for potential sources of heterogeneity. Each moderator was assessed separately, with the effect size at each level of categorical moderators estimated. Study characteristics submitted to moderator analysis are detailed in the eMethods in the Supplement.

Presence of publication bias was assessed with inspection of funnel plots for asymmetry and with Egger regression intercept test,<sup>17</sup> which uses a linear regression approach weighing study effect sizes relative to their standard error. Two-sided *P* values were statistically significant at .05.

## Results

Of 7646 publications our search strategy yielded, 5625 unique records were identified, of which 3332 were excluded based on their titles and abstracts. An additional 2228 were ex-

Figure. PRISMA Flowchart of Literature Search



cluded based on a detailed full-text review, leaving a set of 65 publications satisfying the eligibility criteria. In cases where multiple studies used overlapping samples but presented unique data on prevalence and/or correlate for a SITB type, all studies were retained for relevant analyses. In cases where multiple studies assessed the same SITB prevalence or correlate in overlapping samples, determination of which study to include in the meta-analysis was based on largest sample size for relevant analyses. Twenty-one studies featured overlapping samples, and 7 were excluded at this stage, leaving a final set of 58 studies<sup>18-75</sup> featuring 52 samples (Figure; eTable 1 in the Supplement).

### Prevalence of Preadolescent SITBs

Weighted SITB prevalence (Table 1) was calculated for each sample type (community and clinical) stratified by time frame (lifetime or current/past month). Pooled prevalence was calculated when at least 2 unique associations were available for a given SITB type. For suicide, the pooled community prevalence was based entirely on epidemiological samples and therefore presented as number of deaths per 1 million children. Apart from the 0.79 suicides per 1 million children in epidemiological samples, lifetime prevalence of preadolescent SITBs ranged from 2.56% for suicide attempts to 15.08% for suicidal ideation in community samples and from 0.46% for suicides to 43.18% for suicidal ideation in clinical samples. Current prevalence ranged from 11.65% for suicide attempts to 38.19% for

Table 1. Prevalence Rates of Self-injurious Thoughts and Behaviors by Sample Type and Time Frame

Self-injury type	Sample	Lifetime			Current/past month		
		k <sup>a</sup>	No. of individuals	% (95% CI)	k <sup>a</sup>	No. of individuals	% (95% CI)
Suicide death	Community	11	626 350 284	0.79 (0.40-1.59) <sup>b</sup>	NA	NA	NA
	Clinical	4	10 401	0.46 (0.11-1.96)	NA	NA	NA
Suicide attempt	Community	4	100 893	2.56 (1.86-3.53)	NA	NA	NA
	Clinical	14	897	17.76 (10.19-29.13)	4	459	11.65 (4.03-29.27)
Suicidal ideation	Community	5	101 337	15.08 (14.41-15.78)	12	20 887	12.08 (7.92-17.99)
	Clinical	7	482	43.18 (21.87-67.35)	4	575	38.19 (13.81-70.44)
Nonsuicidal self-injury	Community	3	13 214	6.25 (3.82-10.06)	NA	NA	NA
	Clinical	2	43	37.38 (24.26-52.66)	2	177	21.50 (8.40-44.99)

Abbreviation: NA, not applicable.

<sup>a</sup> k Indicates the number of unique associations; effect size estimates in which k = 2 should be interpreted with caution.

<sup>b</sup> The community prevalence estimate for suicide deaths is based entirely on epidemiological samples and presented as number of deaths per 1 million children.

suicidal ideation in clinical samples and was available only for available for suicidal ideation (12.08%) in community samples.

Although study quality index scores were generally high (mean [SD], 6.45 [1.96]), 3 studies with 10 unique associations scored below 5. Sensitivity analyses were conducted excluding these studies,<sup>14</sup> except for lifetime prevalence of NSSI in community samples, as only 1 relevant study remained. These analyses are presented in eTable 2 in the Supplement.

Heterogeneity was high across lifetime prevalence analyses (suicide:  $I^2 = 95.88$  [clinical sample] and 98.58 [community sample];  $P < .001$ ; suicide attempts:  $I^2 = 87.27$  [clinical sample] and 97.92 [community sample];  $P < .001$ ; suicidal ideation:  $I^2 = 79.53$  [community sample] and 91.66 [clinical sample];  $P < .001$ ), indicating that moderator analyses were warranted. Moderator analyses were not conducted for NSSI, given its few unique associations. Age, percentage of female participants in each sample, measure type, and respondent were evaluated as candidate moderators for suicide attempts and suicidal ideation. Only percentage of female participants was assessed as a moderator for suicide prevalence, as none of the relevant studies reported mean age, and data were derived from death records, making respondent and measure type not applicable.

In moderator analyses (eTable 3 in the Supplement), percentage of female participants was negatively associated with prevalence of suicide attempts and suicidal ideation. Although it did not moderate suicide prevalence overall, when weighted prevalence estimates were stratified by sample type, it was negatively associated with suicide prevalence in epidemiological/community samples ( $b = -0.02$ ;  $SE < .01$ ;  $P < .001$ ). Measure type also emerged as a moderator of prevalence for suicide attempts and suicidal ideation, with higher pooled prevalence observed with interview-based measures. However, these findings are likely artifacts of all relevant studies with self-report measures having community samples, in contrast to 14 of 16 studies of suicide attempts and 7 of 10 studies of suicidal ideation with interview-based measures featuring clinical samples. Suicide attempts and suicidal ideation prevalence were not moderated by age, as may be expected with restricted range in the samples, and respondent.

Publication bias was assessed for lifetime prevalence of each SITB type, except for NSSI, given its few unique associations. Some evidence of publication bias emerged in Egger test for suicide deaths and attempts and in funnel plots for suicide deaths and suicidal ideation (eFigure in the Supplement).

#### Correlates of Preadolescent SITBs

For correlates of suicide attempts (Table 2), neither sociodemographic characteristics nor family history of suicidal thoughts and behaviors were significant. However, clinical correlates were consistently associated with this outcome. Pooled effect sizes ranged from small for anxiety to medium for depression, and small-to-medium effect sizes were observed for psychopathology overall.

Table 3 presents analyses for correlates of suicidal ideation. For sociodemographic characteristics, only race was significant, with a small negative association indicating that children from racial minority groups were less likely to have suicidal thoughts. Among family characteristics, only ones involving family dysfunction and psychopathology were significant correlates, except for parental depression. Effect sizes ranged from small for overall psychopathology to small-to-medium effect sizes for parental history of suicidal thoughts and behaviors.

All clinical correlates of suicidal ideation were significant, save anxiety, posttraumatic stress disorder, and conduct disorder/oppositional defiant disorder. The largest effect sizes were observed for depression (large effect size), overall psychopathology and internalizing psychopathology (medium-to-large effect size), and attention-deficit/hyperactivity disorder (ADHD) (medium). Psychosis had a small-to-medium effect size.

All psychological correlates for suicidal ideation, except general cognitive functioning, had significant medium-to-large effect sizes. These associations were positive for aggression and negative affect and negative for self-esteem. Significant effect sizes were observed for all interpersonal correlates and academic stress, with negative small to small-to-medium effect sizes for social support and medium to large for child maltreatment.



Table 2. Correlates of Suicide Attempts

Correlate	<i>k</i> <sup>a</sup>	No. of individuals	<i>d</i> (95% CI)	<i>P</i> value
Sociodemographic characteristics				
Sex (female)	9	14 738	-0.05 (-0.28 to 0.19)	.69
Race (minority group) <sup>b</sup>	3	13 775	-0.02 (-0.29 to 0.26)	.90
Race (Black, with White as reference)	4	9069	-0.07 (-0.55 to 0.41)	.77
Ethnicity (Hispanic, with non-Hispanic White as reference)	3	9961	-0.19 (-0.67 to 0.28)	.42
Family characteristics				
Family history of suicidal thoughts and behaviors	3	1558	0.15 (-0.04 to 0.34)	.13
Clinical correlates				
Overall psychopathology	6	1904	0.42 (0.20 to 0.65)	<.001
Internalizing psychopathology	6	1895	0.33 (0.19 to 0.48)	<.001
Anxiety	4	1648	0.17 (0.00 to 0.34) <sup>c</sup>	.04
Depression	6	1895	0.47 (0.26 to 0.68)	<.001

<sup>a</sup> *k* Indicates the number of unique associations.

<sup>b</sup> Any racial group besides White.

<sup>c</sup> The lower end of the confidence interval was rounded down but exceeded 0.00.

For suicide and NSSI, meta-analysis of correlates was limited to female sex, which was negatively associated with both outcomes (suicide:  $d = -0.77$  [95% CI,  $-1.03$  to  $-0.52$ ];  $P < .001$ ; NSSI:  $d = -0.17$  [95% CI,  $-0.30$  to  $-0.04$ ];  $P = .008$ ).

### Head-to-Head Comparisons of Preadolescent and Adolescent Suicide

Head-to-head comparisons between preadolescent and adolescent SITBs were only possible for suicide deaths, as a sufficient number of unique associations for this outcome was available for meta-analysis. Female sex and depression were more characteristic of adolescent than preadolescent suicide (Table 4). No group differences were observed for overall psychopathology, psychiatric treatment history, or academic stress.

## Discussion

This systematic review and meta-analysis provides, to our knowledge, the first pooled prevalence estimates of SITBs in preadolescent children, a necessary preliminary step for accurately evaluating the scale of these clinical concerns. The available evidence yielded concerning prevalence estimates for preadolescent SITBs, particularly in clinical samples. Even in community samples, pooled prevalence estimates for lifetime suicidal ideation, suicide attempts, and NSSI were 15.1%, 2.6%, and 6.2%, respectively. Although lower than for adolescents with lifetime prevalence of 19.8% to 24.0% for suicidal ideation and 3.1% to 8.8% for suicide attempts<sup>76</sup> and adolescent NSSI prevalence of 17.2% to 18.0%,<sup>77,78</sup> the current findings indicate that preadolescent SITBs, particularly suicidal ideation and NSSI, are not uncommon. Additionally, the current data suggest that approximately 17.0% of preadolescent children with suicidal ideation transition to attempting suicide, whereas between 15.7% and 36.7% of suicidal adolescents act on their suicidal thoughts. Although suicide deaths among preadolescents are rare, at approximately 1 of 1 million children, compared with 3.8 of 100 000 adolescents in a recent meta-analytic review,<sup>79</sup> preadolescent suicide is a growing public health concern, given recent evidence that they have been in-

creasing in the US<sup>3,9</sup> and the outsized and long-term impact that they have on families<sup>80</sup> (eg, increased parental mortality<sup>81</sup>) and communities.<sup>3</sup> Collectively, the current findings also challenge the long-standing view that preadolescent children do not possess the cognitive capacity to experience suicidal thoughts and to engage in suicidal behavior.<sup>5,6</sup>

Only sex emerged as a moderator of prevalence of suicidal ideation and suicide attempts, such that samples with more male individuals had higher lifetime prevalence. When assessed directly in relation with SITBs, male individuals were more likely to die by suicide and to engage in NSSI, but sex was uncorrelated with suicidal ideation and suicide attempts. Although the precise nature of how sex is associated with preadolescent SITBs remains to be clarified, these findings are consistent in indicating that the higher prevalence of suicidal ideation and suicide attempts among female individuals in adolescence<sup>76,82</sup> do not generalize to preadolescence. Even in the case of suicide, head-to-head comparisons between preadolescent and adolescent suicide decedents suggest that the higher risk of suicide among male individuals in adolescence<sup>76,82</sup> may be more pronounced in preadolescence. Given the size of this association, it cannot be accounted for by the male-biased sex ratio at birth and its decline over the life course.<sup>83</sup>

For correlates of SITBs, additional developmental differences may be found in the social support factors, with non-overlapping confidence intervals indicating that parental support was significantly more associated with suicidal ideation than is peer support, a finding consistent with the tendency for parental relationships to have greater weight prior to adolescence.<sup>84,85</sup> On the other end of the spectrum, the large association for child maltreatment and suicidal ideation is notable, especially within the context of findings that it may be more associated with suicide attempts in childhood than adolescence.<sup>8</sup> Additionally, among specific disorders, ADHD was the second strongest clinical correlate of suicidal ideation, which is congruent with the view that this disorder is more characteristic of suicide outcomes in preadolescence than adolescence.<sup>7</sup>

However, other associations appear to generalize across development; depression had the largest association among

**Table 3. Correlates of Suicidal Ideation**

Correlate	<i>k</i> <sup>a</sup>	No. of individuals	<i>d</i> (95% CI)	<i>P</i> value
<b>Sociodemographic characteristics</b>				
Sex (female)	16	107 881	-0.03 (-0.10 to 0.05)	.50
Race (minority group) <sup>b</sup>	5	16 638	-0.22 (-0.38 to -0.06)	<.01
Race (Black, with White as reference)	4	11 076	-0.31 (-0.61 to 0.00) <sup>c</sup>	.05
<b>Family characteristics</b>				
Parental marital status (married)	5	22 672	0.05 (-0.17 to 0.26)	.65
Parental education	6	14 666	<0.01 (-0.09 to 0.09)	.99
Family income	8	94 230	-0.07 (-0.18 to 0.04)	.21
Family conflict and dysfunction	5	2805	0.36 (0.11 to 0.60)	<.01
Family psychopathology	8	12 322	0.18 (0.09 to 0.26)	<.001
Parental depression	4	5001	0.37 (-0.11 to 0.85)	.13
Parental history of suicidal thoughts and behaviors	4	1208	0.45 (0.05 to 0.86)	.03
<b>Clinical correlates</b>				
Overall psychopathology	19	25 219	0.62 (0.47 to 0.77)	<.001
Internalizing psychopathology	16	19 235	0.71 (0.47 to 0.94)	<.001
Anxiety	6	13 062	0.13 (-0.19 to 0.46)	.42
Depression	13	15 185	0.90 (0.71 to 1.09)	<.001
PTSD	3	12 879	0.32 (-0.14 to 0.78)	.18
Externalizing psychopathology	8	23 619	0.32 (0.08 to 0.56)	<.01
ADHD	6	22 445	0.54 (0.34 to 0.75)	<.001
Conduct disorder/oppositional defiant disorder	4	18 936	0.02 (-0.42 to 0.47)	.91
Psychosis	3	11 847	0.39 (0.16 to 0.63)	<.01
<b>Psychological correlates</b>				
Aggression	7	4967	0.65 (0.04 to 1.27)	.04
Cognitive functioning	4	1903	0.11 (-0.19 to 0.42)	.46
Negative affect	3	863	0.80 (0.12 to 1.47)	.02
Self-esteem	4	916	-0.53 (-0.84 to -0.22)	<.001
<b>Interpersonal correlates</b>				
Overall social support	8	85 128	-0.25 (-0.36 to -0.15)	<.001
Parental support	5	84 934	-0.34 (-0.46 to -0.22) <sup>d</sup>	<.001
Peer support	5	84 469	-0.13 (-0.22 to -0.04) <sup>d</sup>	<.01
Experienced bullying	4	86 166	0.29 (0.26 to 0.33)	<.001
Child maltreatment	5	86 957	2.62 (1.56 to 3.67)	<.001
Child physical abuse	4	84 078	0.66 (0.46 to 0.86)	<.001
Child sexual abuse	4	84 077	0.55 (0.30 to 0.80)	<.001
<b>Other correlates</b>				
Academic stress	4	2861	0.24 (0.11 to 0.37)	<.001

Abbreviations: ADHD, attention-deficit/hyperactivity disorder; PTSD, posttraumatic stress disorder.

<sup>a</sup> *k* Indicates the number of unique associations.

<sup>b</sup> Any racial group besides White.

<sup>c</sup> The upper end of the confidence interval was rounded down but exceeded 0.00.

<sup>d</sup> When unrounded, the upper end of the confidence interval for parental support does not overlap with the lower end of the confidence interval for peer support.

**Table 4. Head-to-Head Comparisons of Preadolescent and Adolescent Suicide Deaths<sup>a</sup>**

Characteristic	<i>k</i> <sup>b</sup>	No. of individuals	<i>d</i> (95% CI)	<i>P</i> value
Sex (female)	4	3173	-0.52 (-0.69 to -0.36)	<.001
Overall psychopathology	3	891	-0.06 (-0.32 to 0.21)	.69
Depression	3	904	-0.41 (-0.71 to -0.10)	.01
History of psychiatric treatment	3	809	-0.16 (-0.48 to 0.15)	.31
Academic stress	3	904	-0.30 (-0.78 to 0.18)	.22

<sup>a</sup> Adolescent suicide served as the reference group in these comparisons; positive *d* values indicate a variable is more characteristic of preadolescent suicide, whereas negative *d* values indicate a variable is more characteristic of adolescent suicide.

<sup>b</sup> *k* Indicates the number of unique associations.

specific disorders in relation to suicidal ideation and moreover was more strongly correlated with this outcome than with suicide attempts, as indicated by nonoverlapping confidence intervals. These findings fit well with the adult literature, in

which depression is more strongly implicated in risk for suicidal ideation than suicide attempts.<sup>86</sup>

Furthermore, based on the aforementioned findings, support for the commonly held view that externalizing psy-

chopathology is more central to suicidal thoughts and behaviors outcomes in preadolescence, whereas depression is in adolescence,<sup>7,8</sup> should be regarded as modest and its evaluation incomplete. Although ADHD had the second largest association among specific disorders in relation to suicidal ideation, all other externalizing disorders had negligible associations. Additionally, only 1 study examined these disorders with suicide attempts,<sup>73</sup> making meta-analytic evaluation impossible. Given that depression had a large association, the largest among individual disorders, in relation to suicidal ideation and a medium association in relation to suicide attempts, depression should not be discounted in preference to externalizing disorders in evaluating preadolescent suicidal thoughts and behaviors. Moreover, head-to-head comparisons indicating greater prevalence of depression in adolescent than preadolescent suicide cannot be taken to mean risk for suicide death associated with this disorder is stronger in adolescence, without direct comparisons of the associations for depression and suicide between these age groups; greater depression prevalence in suicidal adolescents may reflect greater prevalence at this age more generally.<sup>87</sup> When considered with recent findings of genetic associations for ADHD and depression with preadolescent suicidal ideation and attempts,<sup>88</sup> the available evidence suggests that both disorders may be important for determining risk for these outcomes.

### Limitations

Although no racial or ethnic differences were found, except for racial minority status with suicidal ideation, these findings likely reflect historical patterns; the current meta-analysis cannot speak to recent temporal trends, an important one being the identification of higher, and increasing, suicide rates among Black children in the US.<sup>21,89</sup> Temporal definition in another sense, whether identified correlates pre-

cede SITBs, was evaluated in 1 study<sup>25</sup> and thus requires further investigation. Although head-to-head comparisons of preadolescent and adolescent suicide were sometimes possible and provide value in characterizing suicidal youth at each age, complementary analyses comparing the effect size for a given correlate of SITBs at each age, as mentioned above, is necessary to understand the correlate's relative importance to SITBs in preadolescence vs adolescence. There was also a general paucity of NSSI prevalence studies, limiting analyses of prevalence and precluding head-to-head comparisons of preadolescent and adolescent NSSI. Additionally, except in the case of biological sex, there was a notable absence of data on correlates of suicide attempts and NSSI, an important gap to be addressed in future research. Finally, almost all studies presented data from Asian countries, North America, and Europe. Future studies including samples from other parts of the world (eg, Africa and Australia) are needed to characterize the scope and nature of preadolescent SITBs across the world.

### Conclusions

In this systematic review and meta-analysis, SITBs, particularly suicidal ideation, suicide attempts, and NSSI, occurred at concerning rates in preadolescent children. Most studies have focused on suicidal ideation and limited research exists for suicide attempts, suicide, and NSSI. Male individuals appeared to be at greater risk for SITBs in preadolescence than older age groups. Parental support was a particularly key protective factor during childhood, whereas child maltreatment was an important correlate of risk for suicidal ideation. Preliminary evidence suggested that ADHD is especially important for ascertaining risk in the case of suicidal thoughts, and depression in the case of suicidal thoughts and behaviors, in preadolescence.

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