Parental education and youth suicidal behaviours: a systematic review and meta-analysis

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Abstract

Aims. Lower parental education has been linked to adverse youth mental health outcomes. However, the relationship between parental education and youth suicidal behaviours remains unclear. We explored the association between parental education and youth suicidal ideation and attempts, and examined whether sociocultural contexts moderate such associations.

Methods. We conducted a systematic review and meta-analysis with a systematic literature search in PubMed, PsycINFO, Medline and Embase from 1900 to December 2020 for studies with participants aged 0–18, and provided quantitative data on the association between parental education and youth suicidal ideation and attempts (death included). Only articles published in English in peer-reviewed journals were considered. Two authors independently assessed eligibility of the articles. One author extracted data [e.g. number of cases and non-cases in each parental education level, effect sizes in forms of odds ratios (ORs) or beta coefficients]. We then calculated pooled ORs using a random-effects model and used moderator analysis to investigate heterogeneity.

Results. We included a total of 59 articles (63 study samples, totalling 2,738,374 subjects) in the meta-analysis. Lower parental education was associated with youth suicidal attempts [OR = 1.12, 95% Confidence Interval (CI) = 1.04–1.21] but not with suicidal ideation [OR = 1.05, 95% CI = 0.98–1.12]. Geographical region and country income level moderated the associations. Lower parental education was associated with an increased risk of youth suicidal attempts in Northern America (OR = 1.26, 95% CI = 1.10–1.43), but with a decreased risk in Eastern and South-Eastern Asia (OR = 0.72, 95% CI = 0.54–0.96). An association of lower parental education and increased risk of youth suicidal ideation was present in high-income countries (HICs) (OR = 1.14, 95% CI = 1.05–1.25), and absent in low- and middle-income countries (LMICs) (OR = 0.91, 95% CI = 0.77–1.08).

Conclusions. The association between youth suicidal behaviours and parental education seems to differ across geographical and economical contexts, suggesting that cultural, psychosocial or biological factors may play a role in explaining this association. Although there was high heterogeneity in the studies reviewed, this evidence suggests that the role of familial sociodemographic characteristics in youth suicidality may not be universal. This highlights the need to consider cultural, as well as familial factors in the clinical assessment and management of youth’s suicidal behaviours in our increasingly multicultural societies, as well as in developing prevention and intervention strategies for youth suicide.

Introduction

Suicide is the third leading cause of death among youths worldwide (Chen et al., 2020). Suicidal behaviours, including suicidal ideation (thought of killing oneself) and suicidal attempt (non-fatal, self-inflicted destructive acts with explicit or inferred intent to die), are well recognised precursors of suicide death. In fact, evidence suggests that over one-third of youths with suicidal ideation go on to attempt suicide, and suicide rates consistently increase...
from childhood to adolescence (Cha et al., 2018). A greater understanding of the risks associated with suicidal behaviours is needed in order to guide more effective intervention and prevention strategies in context-specific ways (Dervic et al., 2006; Yip et al., 2015). Identifying these risk factors in this particular age group across different societies is therefore of pressing importance. However, existing studies have been largely limited by the use of relatively small sample sizes and by the evaluation of cohorts mostly collected in a single, high-income country (HIC) (Yip et al., 2015).

Family characteristics, along with individual and societal factors, have been shown to contribute to youth suicidal behaviours, and among these, family socioeconomic disadvantage has been suggested to be one of the major risk factors (Aggarwal et al., 2017). Family socioeconomic status (SES) is associated with a wide array of exposures, resources and susceptibilities that may impact health (Galobardes et al., 2006), and families with lower SES suffer from multiple forms of disadvantage (Reiss et al., 2019). Through material hardship, greater parental stress and parental mental health problems and harsher parenting, familial socioeconomic inequalities can contribute to poor mental outcomes on the offspring (Weinberg et al., 2019).

Parental education, as one of the most commonly assessed indicators of familial SES, has been widely studied for its relation to youth mental health outcomes, and found to play a role even when other socioeconomic confounders are taken into account (Sonego et al., 2013). Furthermore, parental education has been found to have a stronger relationship with child and adolescent mental health compared to other family SES indicators, such as parental unemployment or lower occupational status (Reiss et al., 2019). Parental education, specifically reflecting the possession or availability of knowledge, has been noted to affect parenting styles (Carr and Pike, 2012), disciplinary practices (Boe et al., 2014), health investment (Lindeboom et al., 2009), home literacy environment (Keshavarz and Baharudin, 2013) and parental school involvement (Padilla-Moledo et al., 2016), which have been proposed to independently and/or jointly influence youth mental health outcomes.

When it comes to youth suicidality, there is yet no agreement as to whether and how parental education could be associated with a higher risk. While some studies have reported lower parental education to be a risk factor for youth suicidal behaviours (Dubow et al., 1989; Andrews and Lewinsohn, 1992; Evans et al., 2004), others have found no association or even a protective role (Gage, 2013; Chang et al., 2017). Differences in sociocultural contexts in these studies have been proposed to be contributing to these contradictory findings (Boe et al., 2012). As a result, an effort should be made to further elucidate the role of sociocultural contextual differences in these studies, as this could not only help the interpretation of results, but also highlight potential different mediating pathways through which parental education could be related to the risk of youth suicidal behaviours across the globe. Therefore, we conducted this first systematic review and synthesis of empirical evidence on parental education and youth suicidal behaviours, while taking into account the possible role of sociocultural contexts, as reflected by geographical region and country income level.

The primary goal of this systematic review was to establish whether there is an association between parental education and either youth suicidal ideation or suicidal attempts (including suicide death). Our secondary goal was to determine if geographical region and country income level could potentially moderate any observed association.

Methods

Search strategy

We followed the Meta-analyses of Observational Studies in Epidemiology (MOOSE) guidelines (Stroup et al., 2000). We conducted a systematic search on PubMed, PsycINFO, Medline and Embase to screen for studies reporting on the association between parental education and youth suicidality. We applied the following search string: (family OR familial OR household OR parental OR caregiver OR guardian OR mother OR maternal OR father OR paternal) AND (education* OR school*) AND (suicide* OR parasuici* OR ‘self-harm’ OR ‘self-injur*’ OR ‘self-poison*’ OR ‘self-cut*’ OR ‘self-destruct*’ OR ‘self-inflict*’) AND (teen OR teenager OR adolescent OR children OR younger OR youth). We limited search results to (1) English publications, (2) peer-reviewed journals and (3) published between January 1900 and December 2020. Two authors (P. J. C. and N. M.) independently assessed the eligibility of each study. When eligibility could not be established through titles and abstracts, the authors retrieved the full text. Any discrepancy was resolved through discussion and opinion of a third author (P. D.). The search strategy initially yielded a total of 6091 articles (after de-duplication). The search was later supplemented by a screening of the references of the studies included.

Inclusion criteria

We included papers that fulfilled the following criteria: (1) education of parents (or parental figures, such as caregivers or household heads) was assessed and reported as a categorical variable, or reported with beta coefficients if education was measured as a continuous variable; (2) youth suicidal behaviour (thoughts/ideations, attempts or deaths) was assessed separately and independently from other constructs (i.e. other risky behaviours or mental disorders) before the age of 18 (included); (3) concrete case number or person-years data in accordance with different parental educational level was provided, or quantitative associations between parental education level and adolescent suicidal behaviour was reported in the forms of odds ratio (OR) or beta coefficients. We excluded studies of youths with autism spectrum disorders, schizophrenia spectrum disorders and intellectual disabilities. For studies that investigated the same population, we chose the larger or, where this was equal, the most recent one. Reviews, meta-analysis, commentaries, editorials and correspondences were not included.

Study factor

Parental education level, the main study factor, was assessed and reported differently across studies. For the primary analyses, we coded studies according to their treatment of parental education level as a predictor of outcome. For the secondary analyses, we re-categorised parental educational levels into low, middle and high for the purpose of standardisation. Using the International Standard Classification of Education level 3 (ISCED 3; http://uis.unesco.org) as the cut-off point, we categorised an education level below ISCED 3 as low education (i.e. illiteracy, no education, basic or primary education, middle school, lower secondary education or education years below 12); an education level equals to ISCED 3 as middle education (i.e. upper secondary education, high school graduate or education years equal to 12) and an
education level above ISCED 3 as high education (i.e. college/university/master/doctoral degree or education years above 12).

Outcomes

Outcomes of interest were youth suicidal ideation and suicidal attempts (including suicide death). We used the definitions or criteria made to determine positive outcomes in each study. However, studies on youth self-harming behaviours that did not specify whether this had a suicidal intent were excluded from the present review.

Data extraction

General study characteristics including name of the first author, publication year, country/region where the study was conducted, cohort name, case definition and outcome type were extracted. We also extracted: (1) classifications of parental education; (2) methods of assessment of parental education and youth suicidal behaviour (questionnaire, interview or data-linkage); (3) source of information about suicidal behaviours (adult-report, children-report or data-linkage); (4) timeframe of suicidal behaviour assessment (lifetime or specific timeframe, such as e.g. previous 6–12 months); (5) type of data from which the association was determined (cross-sectional or longitudinal); (6) sample type (community or clinical); (7) female/male participant ratio; (8) study country income level as per The World Bank 2021 data (high or low and middle; https://datahelpdesk.worldbank.org) and (9) study geographical region based on the sustainable development goal indicators, the regional groupings defined under the Standard Country or Area Codes for Statistical Use of the United Nations Statistics Division (sub-Saharan Africa, Northern Africa and Western Asia, Central and Southern Asia, Eastern and South-Eastern Asia, Latin America and the Caribbean, Oceania, Europe and Northern America; https://unstats.un.org/sdgs/indicators/regional-groups). For pooling, we obtained the maximally adjusted estimate of the OR compared with the reference for each education level, and the corresponding 95% confidence interval (CI). If ORs were unavailable, we computed ORs from raw data presented in the original studies. If the study measured parental education in years and reported only beta coefficients, we multiplied the coefficients by 4 (a correction factor chosen to reflect the difference in mean years of education between high- and low-parental education level) to better align the results with the rest of the studies on the same scale. If both maternal and paternal education levels were provided, maternal education level was chosen as representative, as more studies chose maternal education as a proxy for parental education. If the study provided survey year or sex stratification of the youths, the results were analysed separately.

Risk of bias assessment

We used the Newcastle–Ottawa Quality Assessment Scale for (1) cross-sectional studies, (2) cohort studies and (3) case control studies to assess risk of bias. Information on (1) sample selection, (2) comparability of cohorts and (3) assessment of outcome were collected. For cohort studies, however, we did not include the question about whether follow-up duration was sufficiently long for the outcome to occur, as this was not applicable. As a result, a maximum score of 8, 8 and 9 could be reached for cross-sectional studies, cohort studies and case control studies, respectively. A total score of 0–4 was considered as indicative of high risk of bias; 5–6 of some concern and 7–9 of low risk of bias.

Data analysis

Random effects meta-analyses with DerSimonian–Laird estimator (DerSimonian and Laird, 1986) were conducted using R (version 4.0.3 GUI 1.73) with the metaphor (Viechtbauer, 2010) and meta (Balduzzi et al., 2019) packages to estimate pooled ORs and 95% CI. Suicidal ideation and suicidal attempt/death were treated as separate outcomes and analysed independently. For the primary analysis, we first derived pooled estimates of the association with outcomes of the lowest parental education level against the highest parental education level from each study with the highest level as the reference; if the study treated parental education as a continuous variable or only provided regression coefficients, we used the beta coefficients (corrected as aforementioned if education was measured in years) as the log odds (Szumilas, 2010). We then performed secondary analyses by pooling estimates of the middle parental education level group (equal to ISCED 3) against the high group (above ISCED 3) with the high group as the reference, the low group (below ISCED 3) against the middle group with the middle group as the reference, and the low group against the high group with the high group as the reference. Secondary analyses were designed to reveal more details on whether and how a specific parental educational achievement could be associated with youth suicidal behaviours.

Heterogeneity was assessed by Q test and I² statistics. An I² value of 50% was indicative of moderate heterogeneity, whereas 75% was considered substantial. When heterogeneity was observed in the data, we tested moderating effects by applying mixed-effects models. Geographical region and country income level were selected as moderators of interest. Other potential moderators investigated were sample type, female ratio, study design, outcome assessment methods, outcome assessment subject, timeframe of the assessed outcome and risk of bias. Risk of publication bias was assessed via visual inspection of funnel plots, supplemented by Egger’s test (Egger et al., 1997).

Results

We identified 8726 articles from PsycINFO, Medline, Embase and PubMed. Of these, 2635 were duplicates and were therefore removed, with 6091 remaining. Further 5889 were later excluded based on titles and abstracts. An additional 145 studies were excluded following screening of full texts. Backward search of the references of the remaining 56 articles resulted in three additional records, leaving a total of 59 articles satisfying the eligibility criteria (Fig. 1).

The 59 articles, published between 1900 and 2020, encompassed 63 eligible study samples, with samples ranging 35 to 2 395 677 individuals, with a total sample size of \( n = 2738374 \). Details of the samples included are presented in Table 1.

The samples were mainly from the community (\( k = 57 \)), with only six studies including clinical populations. Overall, 61 samples estimated the association between parental education and youth suicidal behaviour using outcome data measured at a single time point (cross-sectional), and two samples used cumulative outcome data from repeated assessments obtained during a follow-up period (longitudinal). Most of the samples were from Europe and Northern America (\( k = 34 \)), followed by Eastern and South-Eastern Asia (\( k = 16 \)), Western Asia (\( k = 7 \)), Latin
America and the Caribbean \(k = 3\), Central and Southern Asia \(k = 1\), Oceania \(k = 1\) and sub-Saharan Africa \(k = 1\). A minimal sample number of six from a particular geographical region would qualify its inclusion in the moderator analysis. Most samples included school age adolescents \(k = 56\) and only seven samples included children under the age of 10 years. Half of the samples used maternal education as their study factor \(k = 32\), while the others assessed education of fathers, caregivers, wage earners or the highest education in the household or between parents. In total, 47 samples incorporated ISCED 3 or equivalent in their classification of parental education, therefore allowing us to perform secondary comparisons as detailed in ‘Methods’ section. Among the 63 samples included, 39 investigated suicidal thought/ideation as one of their primary outcomes, and 46 investigated suicidal attempt/death, 21 studied both. Most samples assessed these outcomes through questionnaires \(k = 40\), and the majority derived information regarding suicidal behaviours directly from the participants \(k = 49\). Among the samples included, 34 originally reported adjusted ORs, ORs or beta coefficients, while 29 reported cross-tabulated data. The results of the risk of bias assessment are presented in the online Supplementary material (Tables S1–S3). Among the 39 samples that reported an association between parental education and suicidal ideation, 62% \(k = 24\) fell into the high-risk category, 36% \(k = 14\) were rated as of some concern and only 2% \(k = 1\) were rated as low risk. On the other hand, of the 46 samples that evaluated suicidal attempt, 59% were rated as low or of some concern \(k = 6\) and 21%, 41% \(k = 19\) were rated as high risk.

For the purpose of evaluating the overall effect of parental educational on youth suicidal behaviours, in the primary meta-analyses we used ORs of the lowest parental education level defined in each study with the highest parental educational level as the reference wherever possible, to estimate effect sizes. Pooling effect sizes indicate the risk or likelihood for youth suicidal behaviours for youths with the lower educated parents. Figures 2a and 2b summarise the pooled ORs for suicidal ideation and suicidal attempt. The pooled results reveal a small, but positive association between lower parental education and youth suicidal attempts \(OR = 1.12, 95\% CI = 1.04–1.21\), but not suicidal ideation \(OR = 1.05, 95\% CI = 0.98–1.12\). The heterogeneity ranged from moderate \(I^2 = 70\% \) for suicidal attempt) to substantial \(I^2 = 83\% \) for suicidal ideation), indicating the need for moderator analyses (Table 2). These showed that geographical region \(p = 0.008\) and country income level \(p = 0.02\) were significant moderators of the direction and strength of the association between lower parental education and youth suicidal attempts and ideation. In particular, lower parental education was associated with an increased risk of youth suicidal attempts for studies conducted in Northern America \(OR = 1.26, 95\% CI = 1.10–1.45\), but such association was reversed in studies conducted in Eastern and South-Eastern Asia, where higher parental education was associated with an increased risk of youth suicide attempts \(OR =
| Authors (year, country/region) | Sample size, N | Female sex (%) | Age | Sample | Study type | Parental education | Classification | Ideation/attempt | Tool | Assessment | Subject | Timeframe |
|-------------------------------|----------------|----------------|-----|--------|------------|-------------------|----------------|-------------------|------|------------|---------|-----------|
| Abdeen et al. (2018, Palestine) | 5713 | 0.7 | 13 | Community | Cross-sectional | M | Below secondary; secondary; above secondary | Both | HBSC-ME | Q | Child | 12 months |
| Alaimo et al. (2002, USA) | 754 | 0.52 | 15–16 | Community | Cross-sectional | O | Below high school; high school; above high school | Both | DIS | I | Child | Lifetime |
| Allen and Goldman-Mellor (2018, USA) | 4463 | 0.49 | 14.6 | Community | Cross-sectional | O | No education; high school; some college; college graduate | Ideation – | – | I | Child | 12 months |
| Amit et al. (2014, Israel) | 620 | 0.48 | 14–17 | Community | Cross-sectional | M | 0–11; 12; 13 or more years | Both | DAWBA | I | Both | 4 weeks |
| Anteghini et al. (2001, Brazil) | 1960 | 0.55 | 13–17 | Community | Cross-sectional | O | No more than high school; some college | Both | CAHS | Q | Child | Lifetime |
| Armağan et al. (2020, Turkey) | 60 | 0.93 | 12–18 | Clinical | Cross-sectional | M | Primary school; secondary school; high school | Attempt | – | I | Both | June–December 2017 |
| Asarnow et al. (2011, USA) | 327 | 0.7 | 15.9 | Clinical | Cross-sectional | O | At least college graduate | Attempt | K-SADS | I | Both | Lifetime |
| Assari et al. (2020, USA) | 3271 | 0.5 | 9.5 | Community | Cross-sectional | O | Did not complete high school; completed high school | Attempt | K-SADS | I | Adult | Lifetime |
| Beattie et al. (2019, India) | 1191 | 1 | 13–14 | Community | Cross-sectional | O | Illiterate; literate | Ideation | – | Q | Child | 2 weeks |
| Bolat et al. (2017, Turkey) | 142 | 0.85 | 14.5 | Clinical | Cross-sectional | M | Years | Attempt | Referral | I | Child | November 2014–November 2015 |
| Borges et al. (2008, Mexico) | 3005 | – | 12–17 | Community | Cross-sectional | O | None/elementary school; junior high school; high school; university + | Both | WMH-CID-A | I | Child | Lifetime |
| Bush and Qeadan (2020, USA) sample 1 | 2661 | – | 14–17 | Community | Cross-sectional | M | Below high school; high school; above or equal to college | Attempt | NM-YRRS | Q | Child | 12 months |
| Bush and Qeadan (2020, USA) sample 2 | 3473 | – | 14–17 | Community | Cross-sectional | M | Below high school; high school; above or equal to college | Attempt | NM-YRRS | Q | Child | 12 months |
| Bush and Qeadan (2020, USA) sample 3 | 3117 | – | 14–17 | Community | Cross-sectional | M | Below high school; high school; above or equal to college | Attempt | NM-YRRS | Q | Child | 12 months |
| Chang et al. (2017, China) | 13952 | 0.47 | 10–18 | Community | Cross-sectional | M | Primary school or below; junior middle school; high school or technical secondary school; college or above | Attempt | – | Q | Child | 12 months |
| Chau et al. (2013, France) | 1559 | 0.5 | 13.5 | Community | Cross-sectional | O | Low-parental education | Attempt | Kandel Scale | Q | Child | Lifetime |
| Chen et al. (2020, China) | 610 | 0.49 | 15 | Community | Cross-sectional | O | Unspecified | Ideation | BSSI | Q | Child | Lifetime |

(Continued)
| Authors (year, country/region) | Sample size, N | Female sex (%) | Age | Sample | Study type* | Parent evaluated | Classification | Ideation/attempt | Tool | Assessment | Subject | Timeframe |
|--------------------------------|----------------|----------------|-----|--------|-------------|-----------------|----------------|------------------|------|------------|---------|-----------|
| Chiu et al. (2017, Taiwan)     | 2896           | 0.5            | 15  | Community | Cross-sectional | M               | ≤12; >12 years | Ideation | SCL-15 | Q         | Child | 1 week    |
| Cornell and Huang (2016, USA)  | 47,888         | 0.51           | 14–17 | Community | Cross-sectional | O               | Did not graduate from high school; graduated from a high school; graduated from a 2-year college; completed post-graduate studies | Both | YRBS | Q         | Child | 12 months |
| DiLi et al. (2010, Turkey)     | 136            | 0.83           | 13.8 | Clinical | Cross-sectional | M               | Illiterate; primary school; high school; university | Attempt | SPS | I         | Child | November 2005–September 2007 |
| Franić et al. (2011, USA)      | 803            | 0.5            | 12  | Community | Cross-sectional | M               | 8; 8–12; >12 years | Ideation | –     | Q         | Child | Lifetime |
| Freuchen et al. (2012, Norway) | 378            | –              | 0–15 | Community | Cross-sectional | M               | Neither educated; one parent; both parents educated | Both | –     | Q         | Child | 3 months |
| Gage (2013, Ethiopia)          | 2709           | 1              | 14.2 | Community | Cross-sectional | O               | Not graduated from upper secondary school; graduated from upper secondary school | Both | –     | Q         | Child | 6 months |
| Haavisto et al. (2005, Finland) | 2098          | 0              | 18  | Community | Cross-sectional | O               | Not graduated from upper secondary school; graduated from upper secondary school | Both | –     | Q         | Child | 1 year |
| Kim et al. (2019, Korea)       | 3201           | 0.45           | 15.1 | Community | Cross-sectional | M               | ≤6; 7–9; 10–12; ≥13 years | Ideation | –     | Q         | Child | June 2015–July 2016 |
| King et al. (2019, USA)        | 2104           | 0.63           | 15.1 | Clinical | Cross-sectional | M               | High school graduate or less; some college/technical training; college graduate/professional | Attempt | C-SSRS | Q         | Child | Lifetime |
| Kokkevi et al. (2011, Greece)  | 46,668         | –              | 14–18 | Community | Cross-sectional | O               | Primary/unknown; beyond primary | Attempt | –     | Q         | Child | Lifetime |
| Kovess-Masfety et al. (2015, Europe based, multi-countries) | 4491 | 0.49 | 8.7 | Community | Cross-sectional | M | High school not completed; high school completed; continued after high school | Ideation | DI | Q | Child | Lifetime |
| Lee and Shin (2017, Korea)     | 72,435         | 0.49           | 12–17 | Community | Cross-sectional | M | Below high school graduation; high school graduation; above college graduation; missing | Both | KYRBS | Q | Child | 12 months |
| Leslie et al. (2010, USA)      | 993            | 0.57           | 11–15 | Community | Cross-sectional | O | Below high school; high school diploma/equivalent; above high school | Attempt | – | I | Child | Lifetime |
| Liang et al. (2014, China)     | 2131           | 0.49           | 13.9 | Community | Cross-sectional | M | ≤9; >9 years | Attempt | SHQ | Q | Child | 1 year |
| Liu et al. (2019, China)       | 11,831         | 0.49           | 15  | Community | Cross-sectional | O | Primary school; middle school; high school; professional school; college or above | Both | AHQ | Q | Child | 1 year |
| Liu et al. (2005, China)       | 284            | 0.4            | 15.6 | Community | Cross-sectional | M | Primary school or less; middle school; high school; college | Attempt | YSR | Q | Child | 6 months |
| Authors and Year | Sample Size | Mean Age | Study Type | Education Level | Assessment | Age | Gender | Duration |
|------------------|-------------|-----------|------------|----------------|-------------|-----|--------|----------|
| Liu and Sun (2005, China) | 1920 | 13.6 | Community | Illiterate/semi-illiterate; primary school; middle school; high school; college | Ideation | CBCL | Q | Both | 6 months |
| Lu et al. (2020, China) | 464 | 11-17 | Community | Primary school or below; middle school; high school or above | Ideation | SDQ | Q | Child | 1 year |
| Maimon et al. (2010, USA) | 990 | 11-16 | Community | Below high school; some high school; finished high school; above high school; bachelor’s degree or more | Attempt | – | I | Child | Lifetime |
| Mars et al. (2014, UK) | 4799 | 16 | Community | Below O level; O-level; A level; degree | Attempt | CASE | Q | Child | Lifetime |
| Martin et al. (2016, USA) | 360 | 3-7 | Clinical | Completed high school/GED | Both | DIPA | I | Adult | Lifetime |
| Min et al. (2012, Korea) | 676 | 6.5 | Community | Both parents college educated; one parent college educated; neither parent college educated | Ideation | BASC-2 | Q | Adult | Lifetime |
| Nock et al. (2013, USA) | 6483 | 13-18 | Community | Below high school; high school; some college; college graduate | Both | CIDI | I | Child | Lifetime |
| Oppenheimer et al. (2018, USA) | 238 | 12.2 | Community | Above or equal to BA | Ideation | SITBI | I | Both | Lifetime |
| Paul and Ortin (2019a, USA) | 1090 | 6 | Community | Years | Both | CBCL | I | Adult | 6 months |
| Paul and Ortin (2019b, USA) | 2958 | 9 | Community | Below high school; high school or equivalent; some college or higher | Both | CBCL | I | Adult | 6 months |
| Peter et al. (2008, Canada) | 1032 | 12-15 | Community | Highest level of parental education | Ideation | NLSCY | Q | Child | 12 months |
| Phil and Minde (1995, Canada) | 35 | 13-16 | Community | Both parents have 0-6 years; one parent has 0-6 years, the other has 7 or more years; both parents have 7 or more years | Attempt | – | I | Both | Lifetime |
| Resch et al. (2008, Germany) | 1681 | 7-17 | Community | Low-parental education | Both | YSR | I | Both | Lifetime |
| Reyes et al. (2011, Puerto Rico) | 585 | 12-15 | Community | Below high school; completed high school; above high school | Attempt | CAPI | I | Child | 12 months |
| Sabo et al. (2005, USA) sample 1 | 7993 | 14-18 | Community | Years | Both | – | Q | Child | 1 year |
| Sabo et al. (2005, USA) sample 2 | 7825 | 14-18 | Community | Years | Both | – | Q | Child | 1 year |
| Sampasa-Kanyinga and Hamilton (2016, Canada) | 4955 | 15.2 | Community | High school or less; some college/university; university degree; do not know | Both | YRBS | Q | Child | 12 months |
| Shin et al. (2009, Korea) | 1857 | 13.8 | Community | ≤12; >13 years | Both | K-YSR | Q | Child | 6 months |
| Slap et al. (2001, USA) | 6517 | 16 | Community | Below high school or equivalent; no V5; high school or equivalent, or V5; V5 or college after high school graduation; college graduate; professional school | Attempt | Likert Scale | I | Child | 12 months |

(Continued)
| Authors (year, country/region) | Sample size, N | Female sex (%) | Age | Sample | Study type\(a\) | Parental education | Classification | Ideation/attempt | Tool | Assessment | Subject | Timeframe |
|-------------------------------|----------------|----------------|-----|--------|-----------------|-------------------|----------------|----------------|------|-----------|---------|-----------|
| Steck et al. (2018, Switzerland) | 2 395 677 | 0.49 | 10–18 | Community | Longitudinal | O | Compulsory; secondary; tertiary; not known | Attempt | Linkage | Linkage | Linkage | Lifetime |
| Toros et al. (2004, Turkey) | 4143 | 0.5 | 11–16 | Community | Cross-sectional | M | Years | Attempt | CBDI | Q | Child | Lifetime |
| Tran et al. (2020, Vietnam) | 6427 | 0.54 | 13–17 | Community | Cross-sectional | M | High school and lower; diploma and higher | Ideation | CES-D | Q | Child | 12 months |
| Wang et al. (2019, China) | 1347 | 0.48 | 12.5 | Community | Cross-sectional | O | Elementary or less; middle/high school; college or above; not sure | Ideation | – | Q | Child | 1 month |
| Whetstone et al. (2007, USA) sample 1 | 2197 | 1 | 10–16 | Community | Cross-sectional | O | Below high school; high school graduate; some college or above | Both | YRBS | Q | Child | Lifetime |
| Whetstone et al. (2007, USA) sample 2 | 2095 | 0 | 10–16 | Community | Cross-sectional | O | Below high school; high school graduate; some college or above | Both | YRBS | Q | Child | Lifetime |
| Xiao et al. (2020, China) | 2898 | 0.48 | 14 | Community | Cross-sectional | M | Elementary and below; senior high school and above | Ideation | BSSI | Q | Child | Lifetime |
| Yuen et al. (2000, USA) | 3327 | 0.52 | – | Community | Cross-sectional | O | Below or equal to high school; some college or more | Attempt | MLES | Q | Child | Lifetime |
| Zalsman et al. (2016, Israel) | 957 | 0.49 | 14–17 | Community | Cross-sectional | M | 0–11; 12; 13+ years | Both | DAWBA | I | Child | Lifetime |
| Zhang et al. (2018, China) | 16 271 | 0.48 | 15.3 | Community | Cross-sectional | M | Elementary or below; junior high school; senior high school; college or above | Both | – | Q | Child | 12 months |
| Zubrick et al. (2016, Australia) | 2653 | – | 12–17 | Community | Cross-sectional | O | Year 10 or below; year 11 or 12; diploma or certificate III/V; bachelor’s degree or higher | Both | YRBS | Q | Child | 12 months |

AHQ, Adolescent Health Questionnaire; BASC-2, Behaviour Assessment System for Children; BSSI, Beck Scale for Suicidal Ideation; CAHS, Canada Adolescent Health Survey; CAPI, Computer-Assisted Personal Interviewing; C-SSRS, Columbia-Suicide Severity Rating Scale; CASE, Child and Adolescent Self-harm in Europe; CBCL, Child Behaviour Checklist; CBDI, Child Beck Depression Inventory; CES-D, Center for Epidemiologic Studies Depression; CIDI, Composite International Diagnostic Interview; DAWBA, Development And Well-Being Assessment; DI, Dominic Interactive; DIPA, the Diagnostic Infant and Preschool Assessment; DIS, Diagnostic Interview Schedule; HBSC-ME, Health Behaviour in School aged Children in the Middle East study; I, Interview; K-SADS, Kiddie Schedule for Affective Disorders and Schizophrenia; KYRBS, Korean Youth Risk Behaviour Survey; K-YSR, Youth Self Report-Korean version; M, Mother; MLES, Major Life Events Scale; NLSCY, National Longitudinal Survey of Children and Youth; NM-YRRS, New Mexico Youth Risk and Resiliency Survey; O, Other; Q, Questionnaire; SCL-15, Symptom Checklist-15 item version; SDQ, Strengths and Difficulties Questionnaire; SHQ, Self-Harm Questionnaire; SITBI, Self-Injurious Thoughts and Behaviours Interview; SPS, Suicide Probability Scale; WMH-CIDI-A, World Mental Health computer assisted Adolescent version of the Composite International Diagnostic Interview; YRBS, Youth Risk Behaviour Survey; YSR, Youth Self Report.

\(a\)Cross-sectional type refers to the outcome data used to determine the association in the study was assessed at a single timepoint; longitudinal type refers to the outcome data used to determine the association in the study was repeatedly assessed and accumulated during the follow-up period.
In addition, lower parental education was only associated with an increased risk of youth suicidal ideation in HICs (OR = 1.14, 95% CI = 1.05–1.25), and the association was absent in studies conducted in low- and middle-income countries (LMICs) (OR = 0.91, 95% CI = 0.77–1.08). Egger’s regression test indicated no significant publication bias for both outcomes. The funnel plots also showed no notable asymmetries (online Supplementary Figs S1A and S1B).

A total of 47 samples incorporated ISCED 3 or equivalent in their classification of parental education. These studies were selected for the secondary analyses, in which we evaluated the relationship between lower parental education and youth suicidal ideation and attempts.
behaviours across three parental education level subgroups (low, middle and high). Pooled results showed an increase in risk for suicidal ideation in youths of parents with low education level compared to those of parents with middle-educational level (κ = 13, OR = 1.28, 95% CI = 1.06–1.54) (Fig. 3).

Discussion
Our main finding is that lower parental education is significantly associated with a small increase in the risk of youth suicidal attempts. Furthermore, we found that having parents with a low education level (below ISCED 3) is associated with a higher risk of suicidal ideation than having parents with a middle-education level (equals to ISCED 3). Finally, we also found that the association between parental education and youth suicidal behaviours is moderated by both geographic region and country income level. Specifically, lower parental education is associated with an increased risk of youth suicidal ideation and attempts in studies conducted in HICs and Northern America, respectively, while the opposite is true for studies conducted in Eastern and...
Table 2. Univariate moderator analysis of the relationship between parental education and youth suicidal behaviours

| Outcome               | Moderator                      | k  | N          | Effect size analysis | Heterogeneity analysis |
|-----------------------|--------------------------------|----|------------|----------------------|------------------------|
|                       |                                |    |            | b        | OR  | 95% CI | p   | $i^2$ (%) |
| Suicidal ideation     |                                | 39 | 241,047    |          |     |        |     |          |
|                       | Sample type                    | 0.47|            |          |     |        |     |          |
|                       | Community                      | 38 | 230,687    | 1.05     | 0.98–1.13 | 82.70 |
|                       | Clinical                       | 1  | 360        | 1.47     | 0.60–3.61 | N/A  |
|                       | % Female (continuous)          | 35 | 226,925    | 0.05     | 0.66  |        |     |          |
|                       | Study design                   | 0.37|            |          |     |        |     |          |
|                       | Cross-sectional                | 38 | 240,809    | 1.04     | 0.97–1.12 | 83.00 |
|                       | Longitudinal                  | 1  | 238        | 1.41     | 0.74–2.69 | N/A  |
|                       | Country income level           | 0.02*|           |          |     |        |     |          |
|                       | High                           | 26 | 185,923    | 1.14     | 1.05–1.25 | 71.60 |
|                       | Low-middle                     | 13 | 55,124     | 0.91     | 0.77–1.08 | 85.50 |
|                       | Geographical region            | 0.35|            |          |     |        |     |          |
|                       | Europe and Northern America    | 18 | 99,406     | 1.14     | 1.00–1.29 | 78.10 |
|                       | Eastern and South-Eastern Asia | 13 | 122,833    | 0.96     | 0.81–1.28 | 87.80 |
|                       | Outcome assessment             | 0.15|            |          |     |        |     |          |
|                       | Questionnaire                  | 28 | 218,438    | 1.06     | 0.99–1.15 | 86.80 |
|                       | Other                          | 11 | 22,609     | 0.93     | 0.80–1.09 | 6.40  |
|                       | Outcome assessment subject     | 0.23|            |          |     |        |     |          |
|                       | Child                          | 31 | 231,504    | 1.04     | 0.97–1.12 | 85.90 |
|                       | Other                          | 8  | 9543       | 1.24     | 0.93–1.66 | 0.00  |
|                       | Timeframe                      | 0.76|            |          |     |        |     |          |
|                       | Lifetime                       | 15 | 29,210     | 1.08     | 0.91–1.30 | 83.50 |
|                       | Other                          | 24 | 211,837    | 1.05     | 0.96–1.15 | 78.50 |
|                       | Risk of bias                   | 0.05|            |          |     |        |     |          |
|                       | Low                            | 1  | 1090       | 1.59     | 0.89–2.84 | N/A  |
|                       | Some concern                   | 14 | 85,425     | 0.89     | 0.73–1.09 | 86.30 |
|                       | High                           | 24 | 154,532    | 1.14     | 1.03–1.25 | 80.40 |
| Suicidal attempt      |                                | 46 | 2,704,716  |          |     |        |     |          |
|                       | Sample type                    | 0.52|            |          |     |        |     |          |
|                       | Community                      | 41 | 2,701,947  | 1.12     | 1.03–1.20 | 72.50 |
|                       | Clinical                       | 5  | 2769       | 1.27     | 0.86–1.87 | 17.30 |
|                       | % Female (continuous)          | 37 | 2,634,597  | 0.12     | 0.35  |        |     |          |
|                       | Study design                   | 0.001|           |          |     |        |     |          |
|                       | Cross-Sectional                | 45 | 309,039    | 1.14     | 1.06–1.23 | 68.90 |
|                       | Longitudinal                  | 1  | 2,395,677  | 0.67     | 0.50–0.90 | N/A  |
|                       | Country income level           | 0.07|            |          |     |        |     |          |
|                       | High                           | 34 | 2,648,092  | 1.18     | 1.09–1.28 | 68.50 |
|                       | Low-middle                     | 12 | 56,624     | 0.90     | 0.67–1.20 | 74.00 |
|                       | Geographical region            | 0.008*|           |          |     |        |     |          |
|                       | Europe                         | 6  | 2,448,061  | 1.12     | 0.80–1.56 | 77.70 |
|                       | Northern America               | 22 | 115,831    | 1.26     | 1.10–1.45 | 64.60 |

(Continued)
South-Eastern Asia, where higher parental education appears to be associated with a higher risk of youth suicidal attempts.

Our first finding is consistent with reports from an older systematic review conducted by Evans et al. (2004), which reported that among family socioeconomic characteristics, lower parental educational level and worries for family finance were the only factors associated with an increased risk of adolescent suicidality. Multiple potential pathways have been proposed to mediate the

Table 2. (Continued.)

| Outcome                        | Moderator                  | k  | N     | Effect size analysis | Heterogeneity analysis |
|--------------------------------|----------------------------|----|-------|----------------------|------------------------|
|                                |                            |    |       | b     | OR | 95% CI | p  | i² (%) |
| Eastern and South-Eastern Asia |                            | 7  | 118 761 | 0.72 | 0.54–0.96 | 69.40 |
| Western Asia                   |                            | 6  | 11 151  | 1.17 | 0.96–1.41 | 37.70 |
| Outcome assessment             |                            |    |        | 0.23 |       |       |      |
| Questionnaire                  |                            | 27 | 278 677 | 1.16 | 1.07–1.26 | 77.40 |
| Other                          |                            | 19 | 2 426 039 | 1.02 | 0.83–1.25 | 42.30 |
| Outcome assessment subject     |                            |    |        | 0.95 |       |       |      |
| Child                          |                            | 37 | 299 239 | 1.13 | 1.05–1.22 | 71.90 |
| Other                          |                            | 9  | 2 405 477 | 1.12 | 0.78–1.60 | 64.50 |
| Timeframe                      |                            |    |        | 0.30 |       |       |      |
| Lifetime                       |                            | 20 | 2 481 278 | 1.17 | 1.02–1.35 | 62.30 |
| Other                          |                            | 26 | 223 438 | 1.07 | 0.98–1.18 | 72.60 |
| Risk of bias                   |                            |    |        | 0.41 |       |       |      |
| Low                            |                            | 6  | 3194  | 1.13 | 0.79–1.62 | 45.20 |
| Some concern                   |                            | 21 | 118 727 | 1.22 | 1.04–1.43 | 66.30 |
| High                           |                            | 19 | 2 582 795 | 1.06 | 0.94–1.20 | 74.90 |

*p < 0.05.

Fig. 3. Secondary analysis: forest plot of the associations between lower parental education and youth suicidal behaviours across parental education level subgroups.
association between higher parental education level and more favourable youth health outcomes. For instance, several studies conducted in the West support that higher parental education is associated with better parent–child interaction (Zayas et al., 2000), more positive parenting (Carr and Pike, 2012), healthier lifestyle (Jablonska et al., 2012) and increased resource buffering against stressful life events and supporting children’s problem solving (Reiss et al., 2019). Higher parental education could also be indicative of a broad social and economic positive influence on the home environment, as higher education could give access to higher earnings and more affluent living (Lindeboom et al., 2009). Higher education could also enable parents to better recognise problematic issues in adolescents via stronger mental health literacy and access to sources of support (Villatoro et al., 2018). All of the above could potentially help promote child and adolescents’ well-being and better mental health. In line with this, our first finding supports a possible protective role of higher parental education against youth suicidal attempts.

In contrast, we found no association between lower parental education and youth suicidal ideation in the primary analysis, although such an association became evident in a secondary analysis across education level subgroups, where low education levels were associated with an increased risk of suicidal ideation compared to middle-education levels. The fact that lower parental education was associated with an increased risk of youth suicidal attempts but not with a risk of suicidal ideation in our primary analysis somewhat echoes an observation previously made by Kapi et al. (2007), who suggested that family SES could be more closely related to externalising behaviours rather than internalising domains of adolescent psychopathology. Also, 90% of participants included in studies of suicidal ideation were in their middle to late adolescence, and some authors have suggested that the influence of family SES on youth mental health outcomes could diminish with age (Bøe et al., 2012).

Taken together, the findings of our primary and secondary analyses suggest that the relationship between parental education and youth suicidal ideation might not be linear. Different parental educational milestones may have different effects on this particular outcome, as our secondary analyses showed youths with parents who completed high school had a relatively lower risk of disclosing suicidal ideation compared to those whose parents did not acquire a high school diploma. In contrast, parental education higher than high school was no longer associated with such reduced risk, suggesting that other factors might counteract a potential protective effect of education.

The relevance of factors other than parental education alone is supported by our finding that geographical region and country income level moderated the relationship between parental education and youth suicidal behaviours. This finding suggests that cultural, psychosocial, economical contexts and possibly biological factors, could play a significant role in this particular association. Previous evidence has suggested that contextual differences could affect the relationship between parental education and youth’s well-being (Assari et al., 2018). When studying the influence of parental education, it is vital to take into account contextual factors such as politics, racial compositions, societal attitudes, neighbourhood characteristics, in which families are embedded, as the effect of socioeconomic indicators is complex and can vary across different contexts (Assari et al., 2018). For instance, while high parental education may be linked to positive and less harsh parenting styles in Western cultures, it has also been associated with higher academic expectations and performance stress in Asian cultures, particularly Chinese (Chang et al., 2017). Meanwhile, social expectations and academic pressure to excel are risk factors shared among youths in Asian countries, and prior research has already highlighted that differences in patterns of suicide between East Asia and the West merit further attention (Kwak and Ickovics, 2019).

Similarly, previous literature has also indicated that cultural and social differences between LMICs and HICs could play a role in the presentation and course of youth self-injurious behaviours (Aggarwal et al., 2017). The role of parental education in child health outcomes has become more attenuated over recent decades in low-resource settings as reported by a recent study (Karlsson et al., 2019). Our findings are especially important in light of the fact that 78% of all self-imposed lethal acts occur in LMICs, while the vast majority of research concerning youth suicide is based on populations living in North America and in European countries (Kim, 2019). Our results highlight the importance of investigating context-specific risk and protective factors for youth suicidality, as data informing country and regional variation are urgently warranted to identify modifiable risk factors and to inform differential service needs globally (Biswas et al., 2020).

Nevertheless, our findings should be interpreted with caution in view of some important limitations. For example, moderate to substantial heterogeneity was present in the studies included in the primary analyses. Despite our extensive efforts to explore the sources, we could identify only some of the many possible moderators. Residual differences between studies could be related to sample characteristics, study design, and definitions and classifications of parental education. In addition, the qualitative assessment revealed that several studies had medium to high risk of bias. This was mainly due to suboptimal practices in exposure ascertainment and outcome assessment, since most studies applied self-administered questionnaires to participants. Also, the cross-sectional nature of most of the data included did not make it possible to conclude whether and how parental education is directly or indirectly associated with youth suicidal behaviours. Finally, the studies included in the meta-analysis varied widely in sample size, with one single study contributing to over 85% of the total participant numbers (Steck et al., 2018). However, this study was not overly represented in the synthesis results as it investigated youth suicide death rather than suicidal ideation or attempts. With a much lower prevalence rate, the precision of the study’s estimated effect size was reduced despite having a large sample size, which attenuated the study’s weight in the random effects model.

On the other hand, the present study also has several strengths. First, we believe that this is the first study to have systematically assessed the effect of parental education as an independent variable in youth suicidal behaviours. As noted in previous research, different indicators of family SES could affect health outcomes through different pathways, and therefore should not be combined (Padilla-Moledo et al., 2016). Second, by considering suicidal ideation and attempts separately, we show that these two components of suicidal behaviours, although highly correlated, could in fact have different risk profiles and require different preventive and intervention strategies. Third, our secondary analyses suggest that any effect may not follow a ‘dose-dependent’ pattern. Fourth and last, our results show how critical it is to acknowledge the between-context variation in the association between parental education and youth mental health outcomes.

In conclusion, the present meta-analysis offers a comprehensive synthesis of existing evidence on the relationship between parental education and youth suicidal behaviours, notwithstanding the high
heterogeneity of the studies included. In general, our findings provide initial evidence of an association between lower parental education and increased risk of youth suicidal attempt. In addition, the findings suggest that this association may differ across different geographical and economical contexts, possibly related to cultural, psychosocial and/or biological factors. This indicates that it is crucial for future research to gather more evidence on the determinants of youth suicidal behaviours across the global setting. Furthermore, it highlights the importance of taking into account the cultural as well as the familial context in the clinical management of youth suicidal behaviour in our increasingly multicultural societies.

Supplementary material. The supplementary material for this article can be found at https://doi.org/10.1017/S204579602200004X.

Data. All data used in the systematic review and meta-analyses can be found in the included studies. Extracted data by the authors can be found in the online Supplementary materials.

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Author contributions. P. J. C. and N. M. reviewed literature search results independently. P. J. C. and N. M. had full access to the data and take responsibility for its accuracy and integrity. P. J. C., N. M., C. S., A. J. L., C. M., S. H., C. N. and P. D. completed concept formation and study design. P. J. C., N. M., C. S., A. J. L., C. N. and P. D. contributed to data collection, data analysis or interpretation of the data. P. J. C. drafted the manuscript. N. M., C. S., A. J. L., X. M., R. P., M. M., C. M., S. H., G. S., C. P., M. A. M., G. M., C. N. and P. D. critically revised the manuscript for important intellectual content. P. J. C., N. M., C. S., A. J. L., C. N. and P. D. contributed to the statistical analysis. P. D. provided administrative, technical or material support. N. M., A. J. L., C. N. and P. D. provided expert supervision during data extraction, analysis and interpretation and writing of the manuscript. C. S., C. P. and M. A. M. provided expert supervision during data interpretation and writing of the manuscript. Senior academic P. D. supervised all stages of elaboration of the study.

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References

Abdeen Z, Brunstein-Klimek A, Nakash O, Shibli N, Nagar M, Agha H, Hallaq S, Kanat-Maymon Y, Juerges H and Levav I (2018) The association between political violence and the connection between bullying and suicidality among Palestinian youth. Suicide and Life-threatening Behavior 48, 95–104.

Aggarwal S, Patton G, Reavley N, Sreenivasan SA and Berk M (2017) Youth self-harm in low-and-middle-income countries: systematic review of the risk and protective factors. International Journal of Social Psychiatry 63, 359–375.

Alaimo K, Olson CM and Frongillo EA (2002) Family food insufficiency, but not low family income, is positively associated with dysthymia and suicide symptoms in adolescents. The Journal of Nutrition 132, 719–725.

Allen K and Goldman-Mellor S (2018) Neighborhood characteristics and adolescent suicidal behavior: evidence from a population-based study. Suicide and Life-threatening Behavior 48, 677–689.

Amit B, Krivoj A, Mansbach-Kleinfeld I, Zalsman G, Ponizovsky A, Hoshen M, Farbstein I, Aptor A, Weizman A and Shoval G (2014) Religiousity is a protective factor against self-injurious thoughts and behaviours in Jewish adolescents: findings from a nationally representative survey. European Psychiatry 29, 509–513.

Andrews JA and Lewinsohn PM (1992) Suicidal attempts among older adolescents: prevalence and co-occurrence with psychiatric disorders. Journal of the American Academy of Child & Adolescent Psychiatry 31, 655–662.

Anteghini M, Fonseca H, Ireland M and Blum RW (2001) Health risk behaviors and associated risk and protective factors among Brazilian adolescents in Santos, Brazil. Journal of Adolescent Health 28, 295–302.

Armağan A, Gökçe Nur S, Gizem G, Miraç BU and Ayşe EA (2020) The role of sociodemographic, clinical and neuropsychological variables in suicide attempts in depressed adolescents. Archives of Neuropsychiatry 57, 312.

Asarnov JR, Porta G, Spirito A, Emslie G, Clarke G, Wagner KD, Vitiello B, Keller M, Birmaher B and McCracken J (2011) Suicide attempts and nonsuicidal self-injury in the treatment of resistant depression in adolescents: findings from the TORDIA study. Journal of the American Academy of Child & Adolescent Psychiatry 50, 772–781.

Assari S, Caldwell CH and Miny RB (2018) Maternal educational attainment at birth promotes future self-rated health of white but not black youth: a 15-year cohort of a national sample. Journal of Clinical Medicine 7, 93.

Assari S, Boyce S, Bazargan M and Caldwell CH (2020) African Americans’ diminished returns of parental education on adolescents’ depression and suicide in the Adolescent Brain Cognitive Development (ABCD) study. European Journal of Investigation in Health, Psychology and Education 10, 656–668.

Balduzzi S, Rücker G and Schwarzer G (2019) How to perform a meta-analysis with R: a practical tutorial. Evidence-Based Mental Health 22, 153–160.

Beattie TS, Prakash R, Mauzua A, Kelly L, Javalkar P, Raghavendra T, Ramaanik S, Collumbien M, Moses S and Heise L (2019) Prevalence and correlates of psychological distress among 13–14 year old adolescent girls in North Karnataka, South India: a cross-sectional study. BMC Public Health 19, 1–12.

Biswas T, Scott JG, Munir K, Renzaho AM, Rawil LB, Baxter J and Mamun AA (2020) Global variation in the prevalence of suicidal ideation, anxiety and their correlates among adolescents: a population based study of 82 countries. EClinicalMedicine 24, 100395.

Boe T, Overland S, Lundervold AJ and Hysing M (2012) Socioeconomic status and children’s mental health: results from the Bergen Child Study. Social Psychiatry and Psychiatric Epidemiology 47, 1557–1566.

Boe T, Siversten B, Heievang E, Goodman R, Lundervold AJ and Hysing M (2014) Socioeconomic status and child mental health: the role of parental emotional well-being and parenting practices. Journal of Abnormal Child Psychology 42, 705–715.

Bolat N, Kadak T, Eliaçık E, Sargin E, Inceks S and Gunes H (2017) Maternal and paternal personality profiles of adolescent suicide attempters. Psychiatry Research 248, 77–82.

Borges G, Benjet C, Medina-Mora ME, Orozco R and Nock M (2008) Suicide ideation, plan, and attempt in the Mexican adolescent mental health survey. Journal of the American Academy of Child & Adolescent Psychiatry 47, 41–52.

Bush A and Qeadan F (2020) Social support and its effects on attempted suicide among American Indian/Alaska Native youth in New Mexico. Archives of Suicide Research 24, 337–359.

Carr A and Pike A (2012) Maternal scaffolding behavior: links with parenting style and maternal education. Developmental Psychology 48, 543.

Cha CB, Franz PJ, Guzmán EM, Glenn CR, Kleinman EM and Nock MK (2018) Annual research review: suicide among youth – epidemiology, (potential) etiology, and treatment. Journal of Child Psychology and Psychiatry 59, 460–482.

Chang H, Yan Q, Tang L, Huang J, Ma Y, Ye X and Yu Y (2017) A comparative analysis of suicide attempts in left-behind children and non-left-behind children in rural China. PLoS One 12, e0178743.

Chau K, Baumann M and Chau N (2013) Socioeconomic inequities patterns of multi-morbidity in early adolescence. International Journal for Equity in Health 12, 1–12.
Chen J, Zheng X, Li C, Xiong Q, Yu Q, Shi S and Hu Y (2020) The association between parental marriage satisfaction and adolescent suicidal ideation: the moderating effect of breastfeeding duration. *Children and Youth Services Review* 118, 105-149.

Chiu Y-C, Tseng C-Y and Lin F-G (2017) Gender differences and stage-specific influence of parent–adolescent conflicts on adolescent suicidal ideation. *Psychiatry Research* 255, 424–431.

Cornell D and Huang F (2016) Authoritative school climate and high school student risk behavior: a cross-sectional multi-level analysis of student self-reports. *Journal of Youth and Adolescence* 45, 2246–2259.

DeSimion R and Laird N (1986) Meta-analysis in clinical trials. *Controlled Clinical Trials* 7, 177–188.

Dervic K, Gould MS, Lenz G, Kleinman M, Akkaya-Kalayci T, Velting D, Sonneck G and Friedrich MH (2006) Youth suicide risk factors and attitudes in New York and Vienna: a cross-cultural comparison. *Suicide and Life-Threatening Behavior* 36, 539–552.

DiLi D, Dallar Y and Bakir I (2010) Psychological characteristics of adolescent suicide attempters presenting to a pediatric emergency service. *Turkish Journal of Medical Sciences* 40, 377–390.

Dubow EF, Kausch DF, Blum MG, Reed J and Bush E (1989) Correlates of suicidal ideation and attempts in a community sample of junior high and high school students. *Journal of Clinical Child Psychology* 18, 158–166.

Egger M, Smith GD, Schneider M and Minder C (1997) Bias in meta-analysis: detected by a simple, graphical test. *BMJ* 315, 629–634.

Evans E, Hawton K and Rodham K (2004) Factors associated with suicidal phenomena in adolescents: a systematic review of population-based studies. *Clinical Psychology Review* 24, 957–979.

Franic T, Dodig G, Kardum G, Marčinko D and Ujević A (2011) Early adolescence and suicidal ideations in Croatia. *Crisis* 32, 334–345.

Freuchen A, Kjelsberg E, Lundervold AJ and Grøholt B (2012) Differences between children and adolescents who commit suicide and their peers: a psychological autopsy of suicide victims compared to accident victims and a community sample. *Child and Adolescent Psychiatry and Mental Health* 6, 1–12.

Gage AJ (2013) Association of child marriage with suicidal thoughts and attempts among adolescent girls in Ethiopia. *Journal of Adolescent Health* 52, 654–656.

Galebardes B, Shaw M, Lawlor DA, Lynch JW and Smith GD (2006) Indicators of socioeconomic position (part 1). *Journal of Epidemiology & Community Health* 60, 7–12.

Haavisto A, Sourander A, Multimäki P, Parkkola K, Santalahti P, Helenius H, Nikolakaros G, Moilanen I, Kumpulainen K and Piha J (2005) Factors associated with ideation and acts of deliberate self-harm among 18-year-old boys. *Social Psychiatry and Psychiatric Epidemiology* 40, 912–921.

Jablonska B, Lindblad F, Östberg V, Lindberg L, Rasmussen F and Hjern A (2012) A national cohort study of parental socioeconomic status and non-fatal suicidal behaviour – the mediating role of school performance. *BMC Public Health* 12, 1–8.

Kapi A, Veltisita A, Kavadias G, Lekeva V and Bakoula C (2007) Social determinants of self-reported emotional and behavioral problems in Greek adolescents. *Social Psychiatry and Psychiatric Epidemiology* 42, 594–598.

Karlsson O, De Neeve J-W and Subramanian S (2019) Weakening association of parental education: analysis of child health outcomes in 43 low- and middle-income countries. *International Journal of Epidemiology* 48, 83–97.

Keshavarz S and Baharudin R (2013) Perceived parenting style of fathers and adolescents’ locus of control in a collectivist culture of Malaysia: the moderating role of fathers’ education. *The Journal of Genetic Psychology* 174, 253–270.

Kim HH-S (2019) Parental overprotection and youth suicide behavior in low- and middle-income countries: a multilevel analysis of cross-national data. *International Journal of Public Health* 64, 173–184.

Kim SH, Kim J-S, Yoo HY and Ryu E (2019) Parental occupational status and suicidal ideation in adolescent: cross-sectional secondary data analysis. *Journal of Pediatric Nursing* 45, e57–e63.

King CA, Grupp-Phelan J, Brent D, Dean JM, Webb M, Bridge JA, Spirito A, Chernick LS, Mahabee-Gittens EM and Mistry RD (2019) Predicting 3-month risk for adolescent suicide attempts among pediatric emergency department patients. *Journal of Child Psychology and Psychiatry* 60, 1055–1064.

Kokkevi A, Rotsika V, Arapaki A and Richardson C (2011) Increasing self-reported suicide attempts by adolescents in Greece between 1984 and 2007. *Social Psychiatry and Psychiatric Epidemiology* 46, 231–237.

Kovess-Masfety V, Pilowsky DJ, Goelitz D, Kuijpers R, Otten R, Moro MF, Bitifoi A, Koč C, Lesinskaie S and Mihova Z (2015) Suicidal ideation and mental health disorders in young school children across Europe. *Journal of Affective Disorders* 177, 28–35.

Kwak CW and Ickovics JR (2019) Adolescent suicide in South Korea: risk factors and proposed multi-dimensional solution. *Asian Journal of Psychiatry* 43, 150–153.

Lee S and Shin A (2017) Association of atopic dermatitis with depressive symptoms and suicidal behaviors among adolescents in Korea: the 2013 Korean Youth Risk Behavior Survey. *BMC Psychiatry* 17, 1–11.

Leslie LK, James S, Monn A, Kauten MC, Zhang J and Aarons G (2010) Health-risk behaviors in young adolescents in the child welfare system. *Journal of Adolescent Health* 47, 26–34.

Liang S, Yan J, Zhang T, Zhu C, Situ M, Du N, Fu X and Huang Y (2014) Differences between non-suicidal self injury and suicide attempt in Chinese adolescents. *Asian Journal of Psychiatry* 8, 76–83.

Lindeboom M, Lenna-Nozal A and van Der Klauw B (2009) Parental education and child health: evidence from a schooling reform. *Journal of Health Economics* 28, 109–131.

Liu X and Sun Z (2005) Age of attaining nocturnal bladder control and adolescent suicidal behavior. *Journal of Affective Disorders* 87, 281–289.

Liu X, Tein J-Y, Saddler IN and Zhao Z (2005) Psychopathology associated with suicide attempts among rural adolescents of China. *Suicide and Life-Threatening Behavior* 35, 265–276.

Liu X, Chen H, Liu Z, Wang J and Jia C (2019) Prevalence of suicidal behaviour and associated factors in a large sample of Chinese adolescents. *Epidemiology and Psychiatric Sciences* 28, 280–289.

Lu J, Lin L, Roy B, Riley C, Wang E, Wang K, Li L, Wang F and Zhou X (2020) The impacts of parent-child communication on left-behind children’s mental health and suicidal ideation: A cross sectional study in Anhui. *Children and youth service review* 110, 104785.

Maimon D, Browning CR and Brooks-Gunn J (2010) Collective efficacy, family attachment, and urban adolescent suicide attempts. *Journal of Health and Social Behavior* 51, 307–324.

Mars B, Heron J, Crane C, Hawton K, Kidger J, Lewis G, Macleod J, Tilling K and Gunnell D (2014) Differences in risk factors for self-harm with and without suicidal intent: findings from the ALSPAC cohort. *Journal of Affective Disorders* 168, 407–414.

Martin SE, Liu RT, Merrick LR, DeMarco M, Cheek SM, Spirito A and Boekamp JR (2016) Suicidal thoughts and behaviors in psychiatrically referred young children. *Psychiatry Research* 246, 308–313.

Min HJ, Jon D-I, Jung MH, Hong N, Song MA, Kim YS, Harkavy-Friedman JM, Im H-J and Hong HJ (2012) Depression, aggression, and suicidal ideation in first graders: a school-based cross-sectional study. *Comprehensive Psychiatry* 53, 1145–1152.

Nock MK, Green JG, Hwang J, McLaughlin KA, Sampson NA, Zaslavsky AM and Kessler RC (2013) Prevalence, correlates, and treatment of lifetime suicidal behavior among adolescents: results from the National Comorbidity Survey Replication Adolescent Supplement. *JAMA Psychiatry* 70, 300–310.

Oppenheimer CW, Stone LB and Hankin BL (2018) The influence of family factors on time to suicidal ideation onsets during the adolescent developmental period. *Journal of Psychiatric Research* 104, 72–77.

Padilla-Moledo C, Ruiz J and Castro-Piñero J (2016) Parental educational level and psychological positive health and health complaints in Spanish children and adolescents. *Child Care, Health and Development* 42, 534–543.

Paul E and Ortin A (2019a) Correlates of suicidal ideation and self-harm in early childhood in a cohort at risk for child abuse and neglect. *Archives of Suicide Research* 23, 134–150.

Paul E and Ortin A (2019b) Psychopathological mechanisms of early neglect and abuse on suicidal ideation and self-harm in middle childhood. *European Child & Adolescent Psychiatry* 28, 1311–1319.
Suicidal ideation among Canadian youth: a multivariate analysis. *Archives of Suicide Research* 12, 263–275.

Phil RM and Minde K (1995) Socio-cultural determinants of psychiatric symptomatology in James Bay Cree children and adolescents. *The Canadian Journal of Psychiatry* 40, 304–312.

Reiss F, Meyrose A-K, Otto C, Lampert T, Klasen F and Ravens-Sieberer U (2019) Socioeconomic status, stressful life situations and mental health problems in children and adolescents: results of the German BELLA cohort-study. *PLoS One* 14, e0213700.

Resch F, Parzer P and Brunner R (2008) Self-mutilation and suicidal behaviour in children and adolescents: prevalence and psychosocial correlates: results of the BELLA study. *European Child & Adolescent Psychiatry* 17, 92–98.

Reyes JC, Robles RR, Colón HM, Negrón JL, Matos TD and Calderón JM (2011) Polydrug use and attempted suicide among Hispanic adolescents in Puerto Rico. *Archives of Suicide Research* 15, 151–159.

Sabo D, Miller KE, Melnick MJ, Farrell MP and Barnes GM (2005) High school athletic participation and adolescent suicide: a nationwide US study. *International Review for the Sociology of Sport* 40, 5–23.

Sampasa-Kanyinga H and Hamilton HA (2016) Does socioeconomic status moderate the relationships between school connectedness with psychological distress, suicidal ideation and attempts in adolescents? *Preventive Medicine* 87, 11–17.

Shin YM, Chung YK, Lim KY, Lee YM, Oh EY and Cho SM (2009) Childhood predictors of deliberate self-harm behavior and suicide ideation in Korean adolescents: a prospective population-based follow-up study. *Journal of Korean Medical Science* 24, 215–222.

Slap G, Goodman E and Huang B (2001) Adoption as a risk factor for attempted suicide during adolescence. *Pediatrics* 108, e30–e30.

Sonego M, Llácer A, Galán I and Simón F (2013) The influence of parental education on child mental health in Spain. *Quality of Life Research* 22, 203–211.

Steck N, Egger M, Schimmelmann BG and Kupferschmid S (2018) Suicide in adolescents: findings from the Swiss National cohort. *European Child & Adolescent Psychiatry* 27, 47–56.

Stroup DF, Berlin JA, Morton SC, Olkin I, Williamson GD, Rennie D, Moher D, Becker BJ, Sipe TA and Thacker SB (2000) Meta-analysis of observational studies in epidemiology: a proposal for reporting. Meta-analysis of Observational Studies in Epidemiology (MOOSE) group. *JAMA* 283, 2008–2012.

Szumilas M (2010) Explaining odds ratios. *Journal of the Canadian Academy of Child and Adolescent Psychiatry* 19, 227.

Toroş F, Bilgin NG, Sasmaez T, Bugdayci R and Camdeviren H (2004) Suicide attempts and risk factors among children and adolescents. *Yonsei Medical Journal* 45, 367–374.

Tran QA, Le VTH and Nguyen THD (2020) Depressive symptoms and suicidal ideation among Vietnamese students aged 13–17: results from a cross-sectional study throughout four geographical regions of Vietnam. *Health Psychology Open* 7, 2055102920973253.

Viechtbauer W (2010) Conducting meta-analyses in R with the metafor package. *Journal of Statistical Software* 36, 1–48.

Villatoro AP, DuPont-Reyes MJ, Phelan JC, Painter K and Link BG (2018) Parental recognition of preadolescent mental health problems: does stigma matter? *Social Science & Medicine* 216, 88–96.

Wang J, Zeu J, Luo J, Liu H, Yang Q, Ouyang Y, Hu M and Lin Q (2019) Mental health symptoms among rural adolescents with different parental migration experiences: a cross-sectional study in China. *Psychiatry Research* 279, 222–230.

Weinberg D, Stevens GW, Duinhof EL and Finkenauer C (2019) Adolescent socioeconomic status and mental health inequalities in the Netherlands, 2001–2017. *International Journal of Environmental Research and Public Health* 16, 3605.

Whetstone LM, Morrissey SL and Cummings DM (2007) Children at risk: the association between perceived weight status and suicidal thoughts and attempts in middle school youth. *Journal of School Health* 77, 59–66.

Xiao Y, Chen Y, Chang W, Pu Y, Chen X, Guo J, Li Y and Yin F (2020) Perceived social support and suicide ideation in Chinese rural left-behind children: a possible mediating role of depression. *Journal of Affective Disorders* 261, 198–203.

Yip PS, Youssuf S, Chan CH, Yang T and Wu KC-C (2015) The roles of culture and gender in the relationship between divorce and suicide risk: a meta-analysis. *Social Science & Medicine* 128, 87–94.

Yuen NY, Nahulu LB, Hishinuma ES and Miyamoto RH (2000) Cultural identification and attempted suicide in Native Hawaiian adolescents. *Journal of the American Academy of Child & Adolescent Psychiatry* 39, 360–367.

Zalsman G, Shoval G, Mansbach-Kleinfeld I, Farbstein I, Kanaaneh R, Lubin G and Apter A (2016) Maternal versus adolescent reports of suicidal behaviors: a nationwide survey in Israel. *European Child & Adolescent Psychiatry* 25, 1349–1359.

Zayas LH, Kaplan C, Turner S, Romano K and Gonzalez-Ramos G (2000) Understanding suicide attempts by adolescent Hispanic females. *Social Work* 45, 53–63.

Zhang Y, Wu C, Yuan S, Xiang J, Hao W and Yu Y (2018) Association of aggression and suicide behaviors: a school-based sample of rural Chinese adolescents. *Journal of Affective Disorders* 239, 295–302.

Zubrick SR, Hafekost J, Johnson SE, Lawrence D, Saw S, Sawyer M, Ailey J and Buckingham WJ (2016) Suicidal behaviours: prevalence estimates from the second Australian Child and Adolescent Survey of Mental Health and Wellbeing. *Australian & New Zealand Journal of Psychiatry* 50, 899–910.