SYSTEMATIC REVIEW/META ANALYSIS

Prevalence of Suicidal Ideation and Suicide Attempts among Indian Adolescents and Young Adults (10-24 Years): A Systematic Review and Meta-Analysis of Associated Factors

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ABSTRACT

Background: Although nationally synthesized figures are still scarce, suicidal ideation and attempts among adolescents and young people in India constitute a significant public health concern.

Methods: In accordance with PRISMA 2020 standards, this systematic review and meta-analysis included observational studies that reported the prevalence of suicidal ideation or suicide attempt(s) among Indian people between the ages of 10 and 24 (PROSPERO: CRD420261339999). Up until March 2026, databases (PubMed, Scopus, Web of Science, Google Scholar) were searched. Subgroup and meta-regression analyses examined heterogeneity, while random-effects meta-analysis combined prevalence and odds ratios.

Results: Thirty-three studies were considered (n = 26,093 for suicide attempts and n = 45,541 for suicidal ideation). Suicidal ideation was pooled at 23% (95% CI 16-32%, I^2=99.5%) and suicide attempts at 3% (95% CI 2-6%, I^2=96.8%). Highest ideation rates occurred in the Northeast (34%) and North (25%), with comparable burdens in school (26%) and college (25%) students. Prevalence increased with older age, more recent publication year, and smaller sample size. Key risk factors included female gender (OR 1.46), family issues (OR 2.34), mental health problems (OR 2.48), bullying (OR 2.34), academic stress, and poor academic performance. Evidence certainty was rated low using the GRADE approach.

Conclusion: Approximately one in four to five Indian adolescents reports suicidal ideation, with marked regional and methodological variation. Urgent, multi-sectoral prevention focusing on schools, families, mental health screening, and high-risk groups is essential to address this growing crisis.

Keywords: Suicidal Ideation, Suicide, Attempted, Adolescent, Young Adult, India, Systematic Review, Meta-Analysis

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INTRODUCTION

Suicide and suicidal behaviours among adolescents and young adults represent a major global public health concern, particularly in low- and middle-income countries. According to the World Health Organization (WHO), approximately 727,000 people died due to suicide globally in 2021, and suicide remains one of the leading causes of death among individuals aged 15-29 years.[1] Adolescence and young adulthood are critical developmental stages characterised by emotional, behavioural, social, and academic transitions that may increase vulnerability to psychological distress and suicidal behaviours.[2] Suicidal ideation is clinically important because it frequently precedes suicide attempts and completed suicide, thereby providing opportunities for early identification and preventive intervention.[3]

India, which has one of the world's largest youth populations, contributes substantially to the global burden of adolescent mental health problems and suicide-related behaviours.[4] Adolescent suicidal behaviours in India are influenced by multiple interconnected sociocultural factors, including academic pressure, adverse family environments, social and lifestyle-related stressors, exposure to violence, economic distress, relationship difficulties, and underlying mental health problems.[5,6] The COVID-19 pandemic further aggravated these vulnerabilities through social isolation, academic disruption, loneliness, and emotional distress among students and youth populations.[5,6]

Geographical variation is a prominent feature of adolescent suicidal behaviour research in India.[6,7,8] Evidence from systematic reviews, meta-analyses, and national trend analyses indicates substantial differences in the prevalence and patterns of suicidal ideation, suicide attempts, and suicide mortality across states and regions.[6,7,8] Higher burdens have frequently been reported from several southern and north-eastern states, while marked state-level heterogeneity reflects variations in sociocultural environments, educational pressures, economic conditions, mental health service availability, and reporting practices. These regional disparities highlight the need for context-specific suicide prevention strategies tailored to local risk factors and healthcare resources.[6,7,8]

Gender and sociodemographic characteristics are important determinants of suicidal behaviours among adolescents and young adults. Several studies have reported higher rates of suicidal ideation and attempt among female adolescents, potentially related to emotional vulnerability, gender discrimination, abuse, and internalising psychological symptoms.[6-10] Gender and sociodemographic disparities are prominent features of adolescent suicidal behaviour in India. Recent evidence indicates that adolescent girls consistently report higher rates of suicidal ideation, suicide attempts, and suicide mortality than boys, with female suicide rates substantially exceeding global averages in several Indian states. Suicidal behaviours are also more frequently reported among adolescents residing in urban settings, those from non-nuclear families, and socially or economically vulnerable backgrounds. Regional and developmental disparities further suggest that adolescents from less developed states and disadvantaged sociodemographic contexts may experience greater suicide-related risks.[6-10]

Academic pressure has consistently emerged as one of the strongest contributors to suicidal ideation among Indian adolescents. Examination-related anxiety, fear of failure, high parental expectations, poor academic performance, and highly competitive educational environments have repeatedly been associated with emotional distress and suicidal thoughts among both school and college students.[10-13] Academic stress frequently interacts with depression and anxiety, thereby amplifying suicidal vulnerability and psychological burden in adolescents and young adults.[10-13]

In the Indian context, family and social-environmental influences are strongly associated with suicidal behaviour among adolescents. Family conflict, parental criticism, domestic violence, poor emotional bonding, lack of parental support, and dysfunctional family environments have been identified as important contributors to suicidal ideation and suicide attempts among Indian youth.[6,14] In addition, academic pressure, bullying, peer relationship difficulties, social isolation, socioeconomic stress, and limited access to mental health support services further increase vulnerability to suicidal behaviours among adolescents in India. Supportive family relationships and positive peer and community networks, however, may act as important protective factors against suicidality.[6,14]

Depressive symptoms and other mental health disorders have consistently been identified as major risk factors for suicidal ideation and self-harm behaviours among adolescents.[10,11,15] Mental health problems such as depression, anxiety, psychological distress, and suicidal ideation are common among Indian adolescents and young adults; however, help-seeking remains substantially limited. Evidence suggests that stigma, poor mental health literacy, concerns about confidentiality, fear of negative judgment, and inadequate access to adolescent-friendly mental health services act as major barriers to seeking professional support, leaving many vulnerable youths with unmet mental health needs.[10,11,15]

Despite the growing body of literature, prevalence estimates of suicidal ideation and suicide attempts among Indian adolescents and young adults remain highly heterogeneous across studies and regions. Differences in study design, outcome definitions, assessment tools, and sampling strategies have limited the availability of nationally synthesised evidence regarding the burden and associated factors of suicidal behaviours in this age group. Therefore, the

present systematic review and meta-analysis aimed to estimate the pooled prevalence of suicidal ideation and suicide attempts among Indian adolescents and young adults aged 10-24 years and to identify major associated sociodemographic, psychological, academic, and environmental factors contributing to suicidal behaviours in this vulnerable population.

METHODOLOGY

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 standards were followed in the conduct and reporting of this systematic review and meta-analysis.[16] To guarantee openness and reduce prejudice, the review methodology was prospectively submitted with PROSPERO (registration number: CRD420261339999).

Eligibility Criteria: According to the PICOS (Population, Intervention, Comparator, Outcome, Study design) paradigm, studies were included if they satisfied the following requirements (Table 1).

Information Sources: From the beginning to March 2026, we looked through PubMed/MEDLINE, Scopus, Web of Science, and Google Scholar, among other electronic databases. We manually looked through the included studies' reference lists and pertinent reviews to find more relevant papers. We also contacted the corresponding authors of potentially eligible studies for missing data where necessary.

Search Strategy: A comprehensive search strategy was developed, as shown in Table 2.

Study Selection: For deduplication, all obtained documents were transferred into EndNote X9. Rayyan software was used by two distinct reviewers (LB and BG) to evaluate abstracts and titles for eligibility. The same reviewers then separately evaluated full-text publications of potentially eligible studies. An additional reviewer (PG) was consulted or consulted in order to settle disagreements. A PRISMA flow diagram was used to record the explanations for exclusions at the full-text stage. There was significant inter-rater agreement (Cohen's kappa = 0.85 for full-text and 0.82 for title/abstract screening).

Table 1: PICOS criteria table showing inclusion and exclusion of studies

Component	Inclusion	Exclusion
Population	Adolescents and young adults aged 10-24 years (as defined by WHO) residing in India, including school-going, college/university students, or community-based samples	Studies focusing exclusively on clinical populations (e.g., psychiatric inpatients), non-Indian populations, and age groups outside 10-24 years (unless the majority fell within the range and results were stratified appropriately)
Intervention / Exposure	Not applicable (observational studies). Studies reporting associated factors (sociodemographic, psychological, environmental) were eligible for the secondary objective	Not applicable (no interventional studies were included)
Comparator	Not applicable	Not applicable
Outcome	Primary: Prevalence of suicidal ideation (lifetime, past year, or current) and/or suicide attempts (lifetime or past year) Secondary: Associated factors (e.g., odds ratios or risk ratios for predictors such as depression, academic stress, gender, abuse) Outcomes measured using validated tools (e.g., Beck Scale for Suicidal Ideation, PHQ) or self-reported questionnaires	Research that does not document the frequency of suicide thoughts or attempts. Studies reporting only suicide deaths/completions without ideation or attempt data. Outcomes not measured with any structured/self-report method
Study Design	Observational studies: cross-sectional, cohort, case-control. Published in peer-reviewed journals	Qualitative studies, case reports, reviews, editorials, conference abstracts, non-English language publications, grey literature (theses, reports, preprints not peer-reviewed)

Table 2: Search Strategy

Database	Search Strategy
PubMed/ MEDLINE	("suicidal ideation"[MeSH Terms] OR "suicide, attempted"[MeSH Terms] OR suicid*[Title/Abstract]) AND ("adolescent"[MeSH Terms] OR "young adult"[MeSH Terms] OR adolescent*[Title/Abstract] OR youth [Title/Abstract] OR student*[Title/Abstract]) AND (India [MeSH Terms] OR India*[Title/Abstract]) Boolean operators (AND/OR) used to combine concepts. No language or date filters applied during search. Last updated: March 16, 2026.
Scopus	TITLE-ABS-KEY ("suicidal ideation" OR "suicide attempt" OR suicide*) AND TITLE-ABS-KEY (adolescent* OR youth OR student* OR "young adult") AND TITLE-ABS-KEY (India* OR Indian) Adapted from PubMed with TITLE-ABS-KEY fields for broader coverage. Boolean operators AND/OR applied. No date/language restrictions.
Web of Science	TS= ("suicidal ideation" OR "suicide attempt" OR suicide*) AND TS= (adolescent* OR youth OR student* OR "young adult") AND TS= (India* OR Indian) Using Topic Search (TS) fields. No date/language restrictions.
Google Scholar	allintitle: ("suicidal ideation" OR "suicide attempt" OR suicid*) (adolescent OR youth OR student OR "young adult") India Additional broader searches without allintitle for more comprehensive retrieval. Limited to the first 200-300 results for practical hand-searching.

Data Collection Process: Two reviewers independently extracted data using a standardised, pilot-tested Microsoft Excel form. Study specifics (author, year, location, design, sample size), participant details (age range, distribution of genders, setting [e.g., school, urban/rural], measurement instruments for outcomes, estimates of prevalence (with 95% confidence intervals [CIs] when available), and related variables (e.g., adjusted ORs with 95% CIs for determinants like depression, stress, gender) were among the items that were extracted. Only pertinent arms that reported the prevalence of suicide ideation or attempts in the target group (adolescents and young adults aged 10-24 years) were extracted from multi-arm trials; this criterion was predetermined in the registered PROSPERO protocol. A senior reviewer arbitrated or reached a consensus to settle disagreements. For clarity on missing or ambiguous data, authors were contacted up to thrice.

Data Items: Prevalence was defined as the proportion of participants reporting suicidal ideation or attempts. Where multiple time frames were reported (e.g., lifetime vs. past year), lifetime estimates were prioritized for meta-analysis to maximize comparability. Associated factors were categorized into sociodemographic (e.g., age, gender, urban/rural), psychological (e.g., depression, anxiety), and environmental (e.g., abuse, academic stress). Effect sizes were extracted as ORs or converted where possible. Assumptions for missing data (e.g., standard errors) were handled using standard formulas (e.g., from CIs).

Risk of Bias in Individual Studies: The Joanna Briggs Institute (JBI) Critical Appraisal Criteria for Prevalence Studies was used to evaluate the risk of bias.[17] Each study received a score of low risk (≥7/9 items met), moderate risk (5-6/9), or high risk (<5/9) for bias. These thresholds adhere to standard procedure in systematic evaluations of prevalence data and were predetermined in the licensed PROSPERO protocol (CRD420261339999). Bias was evaluated independently by two reviewers, and disputes were settled through discussion. Studies were investigated in sensitivity analyses rather than being eliminated due to bias.

Effect Measures: To stabilize variances, we employed the Freeman-Tukey double arcsine approach to modify raw proportions for prevalence. We employed log-transformed ORs with standard errors for related covariates.

Synthesis Methods: The statistical software R (version 4.3.1) with the meta and metafor packages was used to do the meta-analysis. A random-effects model (DerSimonian-Laird estimator) was used to estimate pooled prevalence. Cochrane's Q test, I^2 statistic (low: <25%; moderate: 25-50%; high: >50%), and τ^2 were used to evaluate heterogeneity. These cutoff points adhere to the standards for interpreting I^2 values put forward by Higgins et al.[18] Subgroup analyses were pre-planned for the following important moderators: study quality, age group, gender, area, and setting. When at least ten papers offered similar data, meta-regression was utilized to investigate continuous factors (publication year, sample size).

Reporting Bias Assessment: Egger's regression test, Begg's rank test, and funnel plots (visual asymmetry) were used to assess publication bias for results with more than ten studies. To account for any possible missing research, trim-and-fill analysis was used.

Certainty Assessment: For every outcome, the GRADE approach[19] was used to rate the certainty of the evidence, taking into account publication bias, risk of bias, inconsistency, indirectness, and imprecision. There were four levels of certainty for the evidence: high, moderate, low, and extremely low.

RESULTS

Study Selection: A total of 1,195 documents from electronic databases (PubMed: n=428; Scopus: n=210; Web of Science: n=234; Google Scholar: n=323) were found during the literature search. 993 records followed abstract and title screening after duplicates (n = 202) and ineligible documents found by automation techniques (n = 0) were eliminated. 304 reports remained for full-text retrieval after 689 were eliminated. 153 full-text publications were evaluated for eligibility after 151 articles could not be downloaded. In the end, 120 papers were eliminated for failing to meet inclusion criteria (n = 42), irrelevant outcomes (n = 48), Reviews/Editorials/conference abstracts/duplicate reports/non-original research (n = 15), or language/other difficulties (n = 15). 33 studies were incorporated in the qualitative synthesis and quantitative synthesis (meta-analysis) as a result of this approach. The PRISMA flow chart (Figure 1) depicts the study selection procedure.

Features of the Included Research: The 33 included studies spanned from 2006 to 2025 and were conducted across various Indian states, with a predominance in the South (n=8), North (n=9), West (n=8), East (n=4), and Northeast (n=3) zones. One study was multi-state or pan-India. Sample sizes ranged from 120 to 7,560 participants, primarily adolescents and young adults (aged 10-24 years), with a focus on school-going or college students. Most studies were cross-sectional (n=30), with two retrospective and one cohort designs. Suicidal ideation (SI) was the primary outcome in 31 studies, suicide attempts in 11, and both in 9. Measurement tools varied, including the Beck Scale for Suicidal Ideation, Patient Health Questionnaire, and self-reported questionnaires. Associated factors commonly reported included gender, academic stress, depression, family problems, abuse, and socioeconomic status. Study characteristics are summarized in Table 3. Among the 33 included studies,[5,20-51] one (Vidhate SS et al., 2022)[25] was a retrospective medico-legal au-

topsy study of 84 completed adolescent suicides. Although the primary focus was on suicide deaths, the study documented history of previous suicide attempts and expressed suicidal ideation as recorded in police inquest reports, family statements, and prior hospital records. These data were extracted for the secondary outcome of associated factors and patterns of suicidal behavior, consistent with the PICOS framework. A sensitivity analysis excluding this study yielded identical pooled prevalence estimates, confirming robustness of the findings.

Risk of Bias in Included Studies: Using the Joanna Briggs Institute (JBI) checklist, 18 studies were rated as low risk of bias (≥7/9 criteria met), primarily due to adequate sample representativeness, valid outcome measurement, and appropriate statistical analysis. Ten studies[5,21,23,25,29,31,33,41,43,47] were at moderate risk (5-6/9), often owing to small sample sizes or non-random sampling. Five studies[22,26,35,49,51] were high risk (<5/9), mainly from inadequate response rates or unclear measurement reliability. No studies were excluded based on bias, but sensitivity analyses were conducted excluding high-risk studies, which did not significantly alter pooled estimates.

Synthesis of Results

Prevalence of Suicidal Ideation and Attempts: The pooled prevalence of suicidal ideation is approximately 23% (95% CI 16-32%, based on 31 studies with ~45,541 participants, I^2=99.5%), indicating that roughly 1 in 4-5 adolescents report thoughts of suicide, though with extreme heterogeneity (Figure 2). In contrast, suicide attempts show a much lower pooled prevalence of 3% (95% CI 2-6%, based on 11 studies with ~26,093 participants, I^2=96.8%), equating to about 1 in 33 adolescents, with a prediction interval up to 23% and similarly high heterogeneity driven by definitional, sampling, and contextual differences (Figure 3).

Subgroup Analysis

Subgroup analysis by geographic zone showed marked regional variation in suicidal ideation prevalence. The highest pooled estimate was in the Northeast (34%, 95% CI 8-76%, I^2=99.9%, 3 studies, n=17,653), followed by North (25%, 95% CI 15-39%), East (23%), South (20%), and West (17%). One multi-zone study reported 49%. High heterogeneity persisted across zones (Figure 4).

Subgroup analysis by population type (school, college, community) showed similar pooled prevalences: school students 26% (95% CI 18-36%), college students 25% (95% CI 14-38%), and community 12% (95% CI 2-45%). Differences were not statistically significant (p=0.5932). Overall pooled prevalence remained 23% (95% CI 16-32%) (Figure 5).

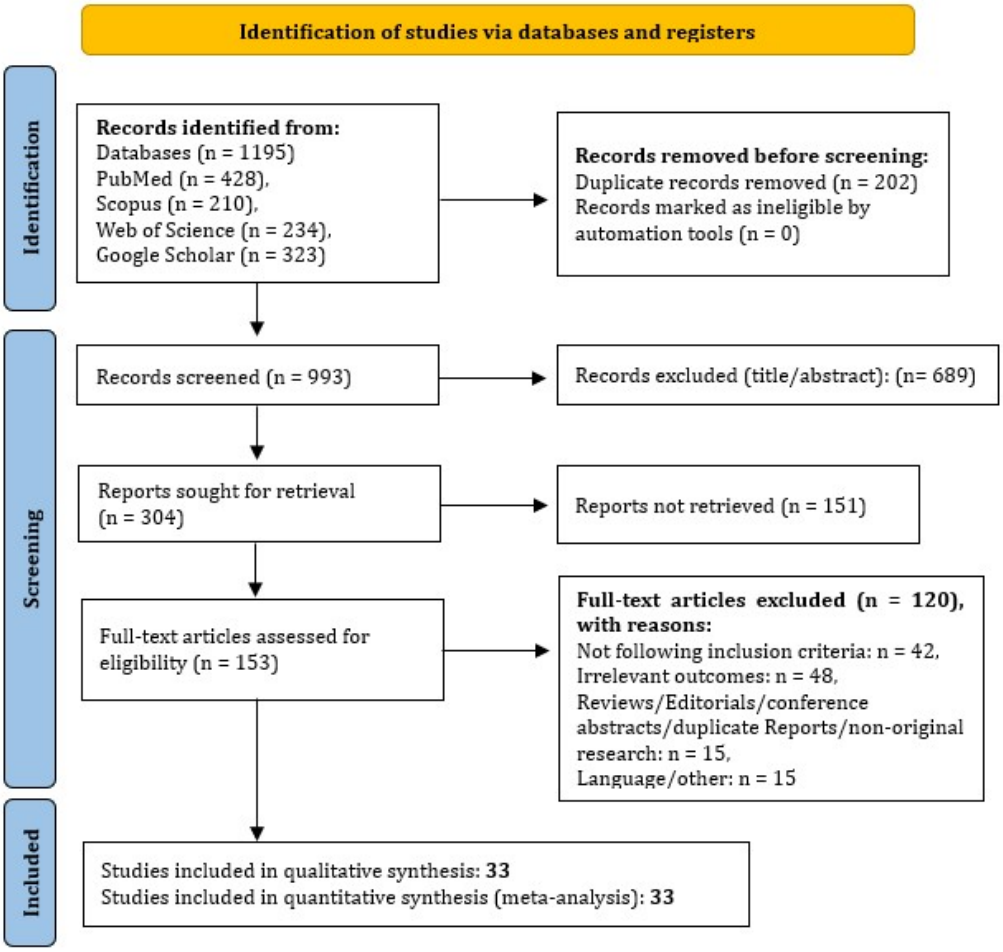

Figure 1: PRISMA Flow diagram displaying study selection

Table 3: Features of the research included

Author (Year)	Mean Age (yrs)	Type of Study	Population	Tool for Suicidal ideation/attempt	State	Zone	Major Findings
Khumanlambam et al. (2025)[20]	15.56	Cross-sectional	School students	Patient Health Questionnaire-9	Manipur	North-ast	Major depressive symptoms: 41.7%; significant academic stress: 88.3%; suicidal thoughts: 43.9%. 51% of the relationship between academic stress and suicide thoughts is mediated by depressive symptoms.
Frey et al. (2024)[5]	21.53	Cross-sectional	College students	Self-structured questionnaire	Pan-India (COVID 19 focus; (Kerala influence)	Multi-Zone	Suicidal ideation: 48.7%. Predictors: fear of failure, sleep disturbance, loneliness, sadness, loss of interest; partial support for 3-Step Theory (pain without hopelessness still leads to ideation).
Devika et al. (2024)[21]	NR (Not Reported)	Cross-sectional	College students	Columbia Suicidal Severity Rating Scale	Kerala	South	Suicidal ideation: 28%. Predictors: lack of teacher support (91.4%), social media abuse (74.3%), loneliness/hopelessness (72.9%). Associated with parental education and family suicide history.
Kumari et al. (2023)[22]	NR	Cross-sectional	College students	Suicidal Ideation Questionnaire	Jharkhand	East	The highest percentage of boys (95%) and girls (95%) were in the average range of suicidal thoughts. It was discovered that girls (5%) had a higher rate of suicide ideation than boys (4%). (5 percent). Suicidal ideation at very low, high, and very high levels was absolutely absent in the boys and girls groups
Maurya et al. (2022)[23]	18.61	Prospective cohort study	Community	Self-structured questionnaire	Uttar Pradesh & Bihar	North/ East	Cyberbullying victimization associated with depressive symptoms (33% females, 16.6% males) and suicidal ideation (7.5% females, 2.3% males).
Ghosh et al. (2022)[24]	17.3	Cross-sectional	Community	Suicidal Ideation Questionnaire	Tripura	North-east	High suicidal ideation: 9.6%. Associated with male gender, urban residence, substance use, and non-peaceful family.
Vidhate et al. (2022)[25]	NR	Retrospective	Community	NR	Maharashtra	West	84 suicidal deaths (adolescents); hanging: 79.76%; love affairs: 42.85% precipitant. Higher in late adolescents, females.
Londhe et al. (2021)[26]	NR	Cross-sectional	College students	Suicidal Ideation Questionnaire	Maharashtra	West	Suicidal ideation is similar in males/females (moderate: ~35%, low: ~65%, high: ~1%). (Junior college students.)
Desai et al. (2021)[27]	NR	Cross-sectional	College students	PHQ-9	Gujarat	West	Suicidal ideation: 9%; depression: 14%. Predictors: female gender, alcohol use, abuse history, and academic/family/relationship stress.
Nesan et al. (2020)[28]	NR	Cross-sectional	College students	Beck Scale for Suicidal Ideation	Karnataka	South	Moderate risk: 8.9%; high risk: 3.6%. Associated with neglect by parents/teachers, smoking/alcohol, addictions, and social factors.
Aggarwal et al. (2019)[29]	18.6	Cross-sectional	College students	Self-structured questionnaire	Maharashtra	West	Suicidal ideation: 3.74%-13.08%. Most common thought: "life not worth living" (13.08%); 17.86% of ideators attempted suicide; depression as common cause.
Nisa et al. (2019)[30]	19	Cross-sectional	School students	Beck scale for Suicidal Ideation	Jammu & Kashmir	North	Suicidal ideators: 29.3%; attempts: 9.75%. (Youth aged 15-25; alarming rates.)
Beattie et al. (2019)[31]	13	Cross-sectional	Adolescent girls	Self-structured questionnaire	Karnataka	South	Suicidal ideation: 2.1%; thoughts of being better off dead: 2.1%. Associated with eve-teasing, abuse, lack of parental support, and school dropout. No hope for the future: 35.1%.
Ahad et al. (2018)[32]	16.5	Cross-sectional	School students	Suicidal Behaviour Questionnaire	Jammu & Kashmir	North	Suicidal ideators: 28.3%; attempts: 7.7%. (Higher secondary students; alarming trend.)
Ram et al. (2018)[33]	NR	Cross-sectional	College students	Suicidal Ideation Questionnaire	Jharkhand	East	Severe/moderate suicidal ideation is higher in undergraduates and females vs. postgraduates/males. Associated with anxiety, depression, and conduct problems from earlier ages.
Bhola et al. (2017)[34]	17.5	Cross-sectional	mixed adolescents/ young adults, College students	Suicidal Ideation Questionnaire	Karnataka	South	Non-suicidal self-injury and suicidal behaviors; predictors include emotional dysregulation, impulsivity, and depression.
Arun et al. (2017)[35]	13.65	Cross-sectional	School students	Suicide Risk-11	Chandigarh	North	Suicidal ideation prevalence is not directly stated; stressors (e.g., exams, parental expectations, peers) are common across academic levels. Higher ideation in typically achieving adolescents is correlated with psychological discomfort.

Author (Year)	Mean Age (yrs)	Type of Study	Population	Tool for Suicidal ideation/attempt	State	Zone	Major Findings
Jaisoorya et al. (2017)[36]	15.3	Cross-sectional	School students	Kessler Psychological Distress Scale	Kerala	South	Severe psychological distress: 4.9%; mild: 10.5%; moderate: 5.4%. Associated with older age, not living with parents, urban residence, academic failure, substance use, suicidality, and sexual abuse.
Shelke et al. (2015)[37]	NR	Cross-sectional	School students	Kutcher Adolescent Depression Scale	Maharashtra	West	Depression: 6.66% (screened positive; linked to suicidal ideation). Associated with residence (rural/urban), family type; no difference by sex, class, socioeconomic status.
Thakur et al. (2015)[38]	NR	Cross-sectional	School students	Self-structured questionnaire	Himachal Pradesh	North	Suicidal ideation: 30.9%. Associated with family issues, verbal/physical abuse, body image concerns; protective factors: discussing problems with parents, good teacher/classmate relations.
Kumar et al. (2013)[39]	15.6	Cross-sectional	School students	Suicidal Ideation Questionnaire	Jharkhand	East	Suicidal ideation: 33.2% (no racial difference between tribal/nontribal). Associated with psychological discomfort (59.1%), anxiety, depression; higher depression in tribal boys.
Russell et al. (2013)[40]	NR	Prospective cross-sectional	Community	SAD PERSONS scale	Kerala	South	Anxiety disorders increase suicidal risk (adjusted OR=6.28). Higher in boys with generalized anxiety/separation/social anxiety; associated with depressive disorder.
Talwar et al. (2013)[41]	NR	Cross-sectional	College students	Suicide Risk-11	Chandigarh	North	Of those who had suicidal thoughts, 6% showed substantial psychosocial stress and depression.
Nagendra et al. (2012)[42]	NR	Cross-sectional	School students	Beck Scale for Suicidal Ideation	Karnataka	South	Depression: 57.7%; suicidal thoughts were far more common in those who were depressed (41.7%) than in those who weren't (11.4%). Residential schools, nuclear households, age, sex, academic achievement, family conflicts, and parental illness or drunkenness are all linked.
Nath et al. (2012)[43]	NR	Cross-sectional	College students	Self-structured questionnaire	Gujarat	West	Lifetime suicidal ideation: 11.7%; attempts: 4%. Associated with the female gender, economic stress, religious violence, and caste discrimination/conflicts.
Goyal et al. (2012)[44]	18.9	Cross-sectional	College students	Self-structured questionnaire	Delhi	North	Suicidal ideation: 53.6%. Associated with female gender, impulsive behavior, feeling "better off dead," non-working mothers; no association with age or father's education/occupation.
Solomon et al. (2011)[45]	NR	Cross-sectional	School students	Self-structured questionnaire	Maharashtra	West	Suicidal ideation: 12%; suicide attempts (past 6 months): 6.1%. Associated with minority religious status, smoking; no age/gender association.
Mohanraj et al. (2010)[46]	15.6	Cross-sectional	School students	Beck Scale for Suicidal Ideation	Tamil Nadu	South	Moderate/severe depression: 19.4%/4.3%; suicidal symptoms common (e.g., sadness, irritability). No gender difference in ideation, but higher in older adolescents.
Chatterjee et al. (2010)[47]	20.12	Cross-sectional	College students	Suicidal Ideation Questionnaire	West Bengal	East	High suicidal ideation in females: 12.5%. Reasons for living negatively correlated with suicidal thoughts; emotional manifestations (sadness, irritability) were dominant.
Pillai et al. (2009)[48]	19.4	Cross-sectional	Community	Self-structured questionnaire	Goa	West	3.9% have engaged in suicidal conduct in the last three months. Common mental problems, premarital sex, not going to school, independent decision-making, and physical/sexual abuse are all associated with the feminine gender.
Arun et al. (2009)[49]	NR	Cross-sectional	School students	Suicidal Risk Eleven	Chandigarh	North	Life as a burden: 8.82%; suicidal ideas: 6%; suicide attempts: 0.39%. Associated with psychological problems (45.8%), academic decline (45%), and family/peer stressors.
Sharma et al. (2008)[50]	16.5	Cross-sectional	School students	Self-structured questionnaire	Delhi	North	Thought of attempting suicide: 15.8%; actual attempts: 5.1%. Higher in females; associated with age, parental living status, mother's working status, part-time work, role models, smoking/drinking.
Sidhartha et al. (2006)[51]	14.73	Cross-sectional	School students	Self-structured questionnaire	Delhi	North	Suicide attempts (lifetime): 8%; attempts (last year): 3.5%; lifetime suicidal ideation: 21.7%; suicidal ideation (last year): 11.7%. Risk factors include Hinduism, female sex, advanced age, parental physical abuse, feeling abandoned, fleeing school, friend suicide history, a death wish, and intentional self-harm.

Vidhate et al. (2022)[25] was a medico-legal study of completed suicides that also reported prior attempts and ideation from inquest records.

Subgroup analysis by measurement tool revealed highly significant differences (p<0.0001). Standardised multi-item scales yielded higher prevalence estimates, whereas single-item tools produced lower and more variable estimates, highlighting the measurement tool as a key moderator (Figure 6).

Subgroup analysis by study design showed that cross-sectional studies reported a pooled prevalence of suicidal ideation of 24% (95% CI: 17%-33%) among Indian adolescents, with very high heterogeneity (I^2 = 99.2%). In contrast, the only prospective cohort study reported a lower prevalence of 6% (95% CI: 6%-6%). The difference between subgroups was statistically significant (p < 0.0001), indicating that prevalence estimates varied according to study type. Cross-sectional studies tended to report higher prevalence, possibly due to methodological differences and point-in-time assessment of distress (Figure 7).

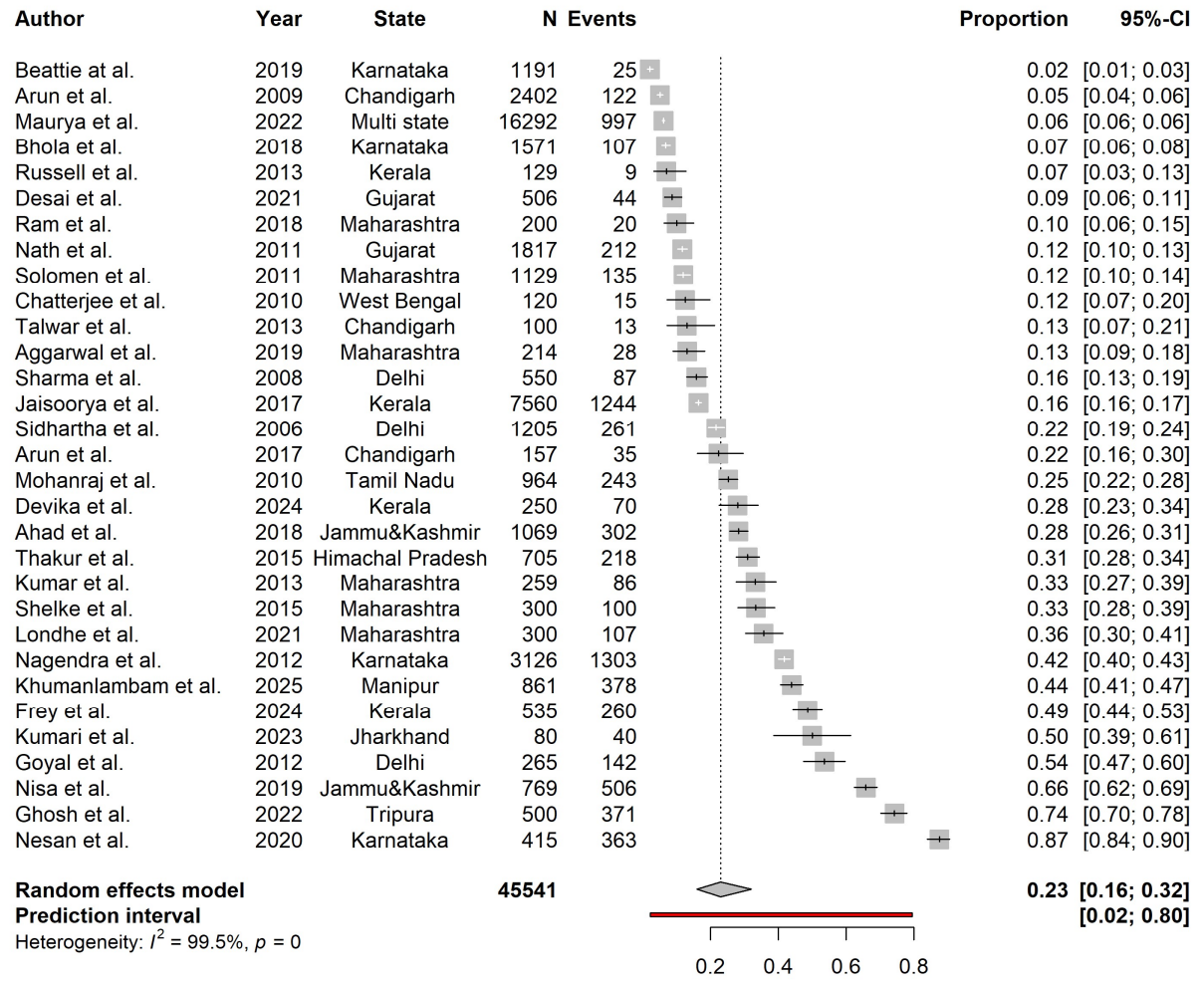

Figure 2: Forest plot showing prevalence of suicidal ideation among adolescents in India

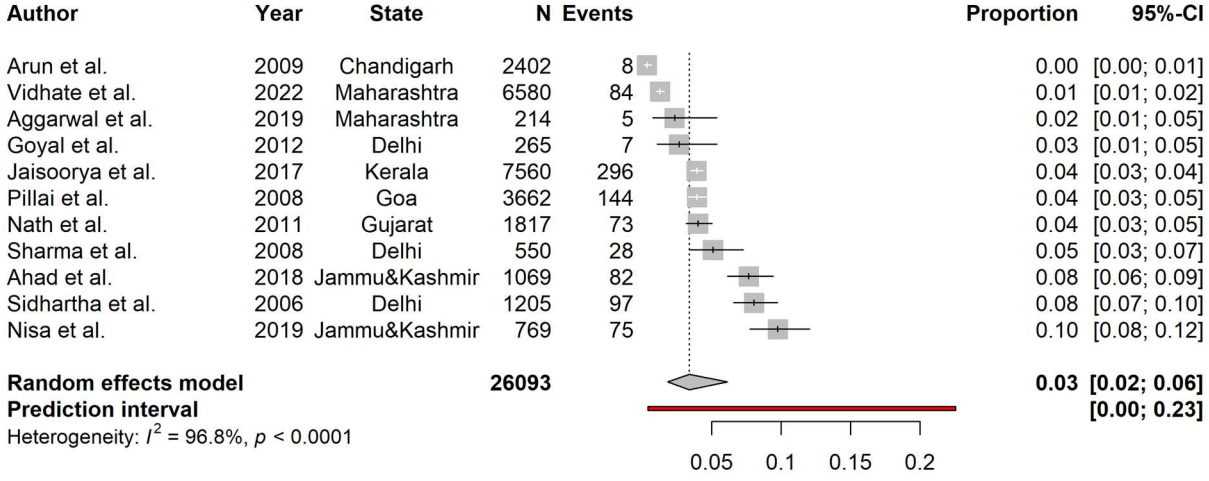

Figure 3: Forest Plot showing prevalence of suicidal attempts among adolescents in India

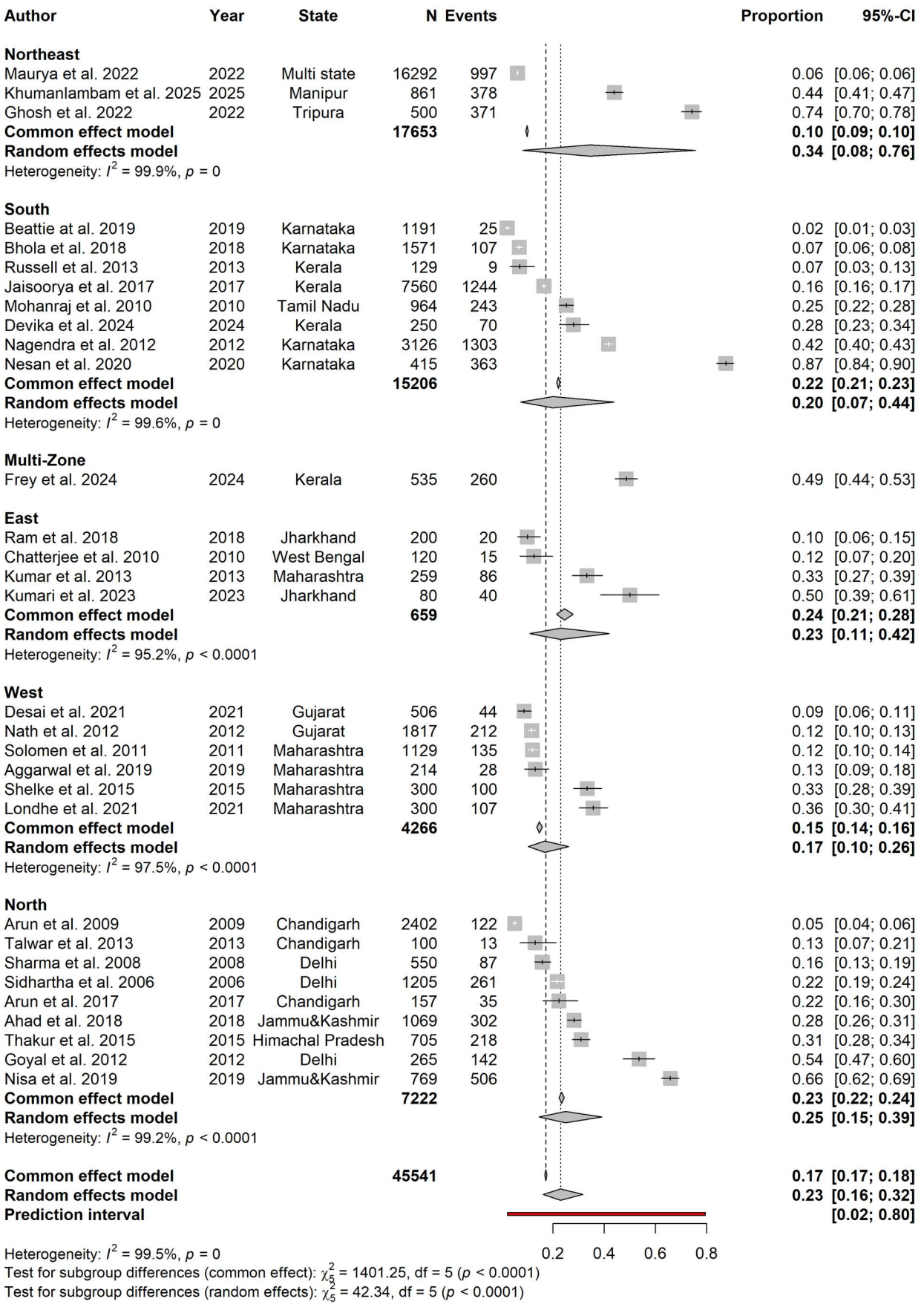

Figure 4: Forest plot showing subgroup analysis of the prevalence of suicidal ideation according to zones among adolescents in India

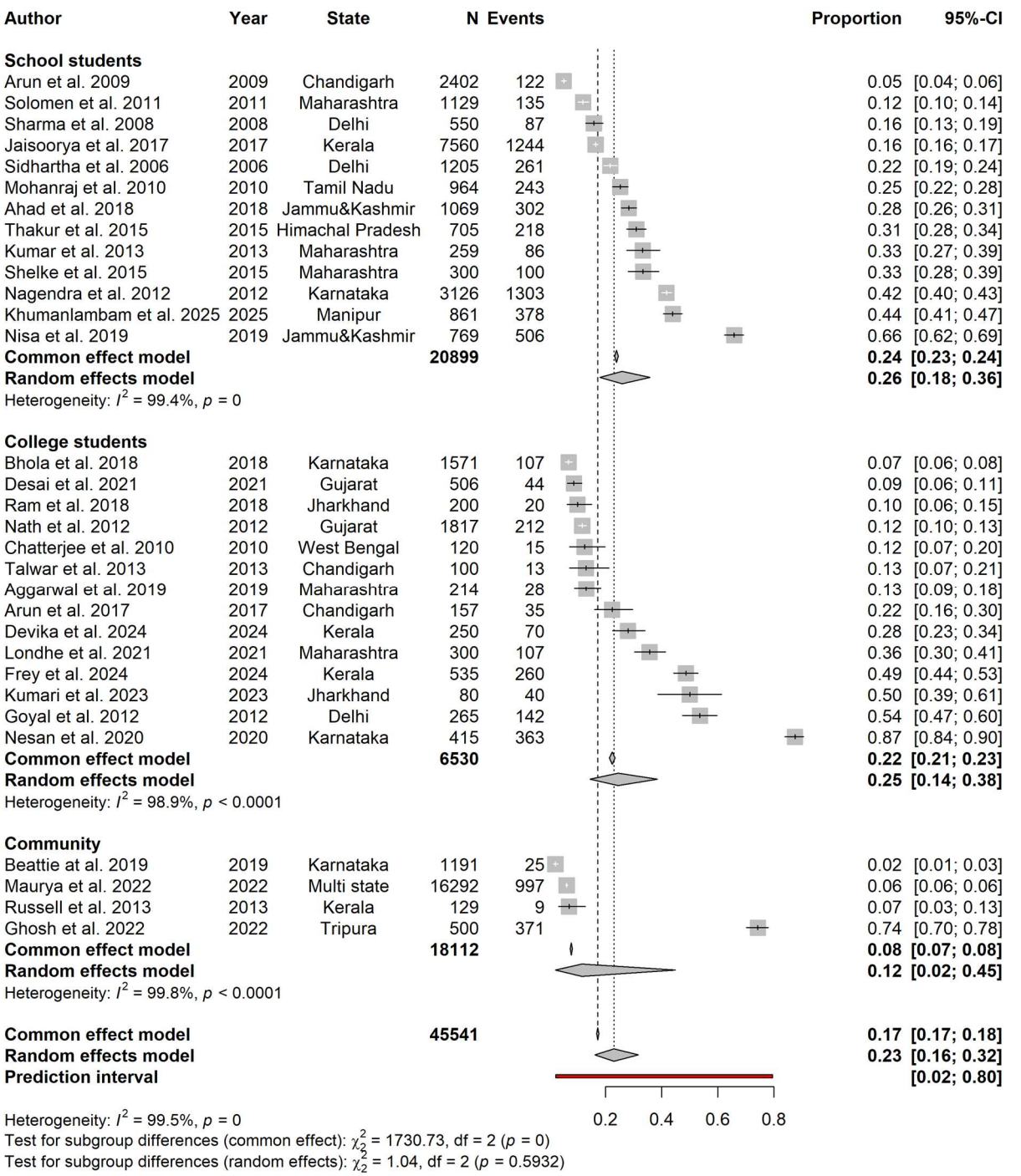

Figure 5: A forest plot displaying subgroup analysis of suicidal ideation incidence by Adolescent population type in India

Subgroup analysis by gender (male vs. female) showed a female predominance in suicidal ideation (higher SI prevalence among females), consistent with several studies (Sharma, 2008[50]; Goyal, 2012[44]; Nath, 2012[43]; Desai, 2021[27]; and Sidhartha, 2006[51]). This finding aligns with the pooled odds ratio of 1.46, indicating higher odds of suicidal ideation among females. In contrast, Ghosh (2022)[24] from Northeast India and Kumari (2023)[22] from Jharkhand reported male predominance or no significant gender difference, while Solomon (2011)[45] did not explicitly assess gender-based associations.

Subgroup analysis by time frame (lifetime vs. recent/past-year estimates) showed that lifetime prevalence estimates were generally higher than those based on shorter recall periods. For example, Sidhartha (2006)[51] reported a lifetime prevalence of 21.7% compared with a past-year prevalence of 11.7%. Similarly, studies assessing suicidal ideation over recent periods (past year, past 6 months, or past 2 weeks) reported lower prevalence estimates, including 9.0% in Desai (2021)[27], 11.7% in Sidhartha (2006)[51], and 6.1% in Solomon (2011)[45], suggesting that longer recall periods capture a greater cumulative burden of suicidal ideation.

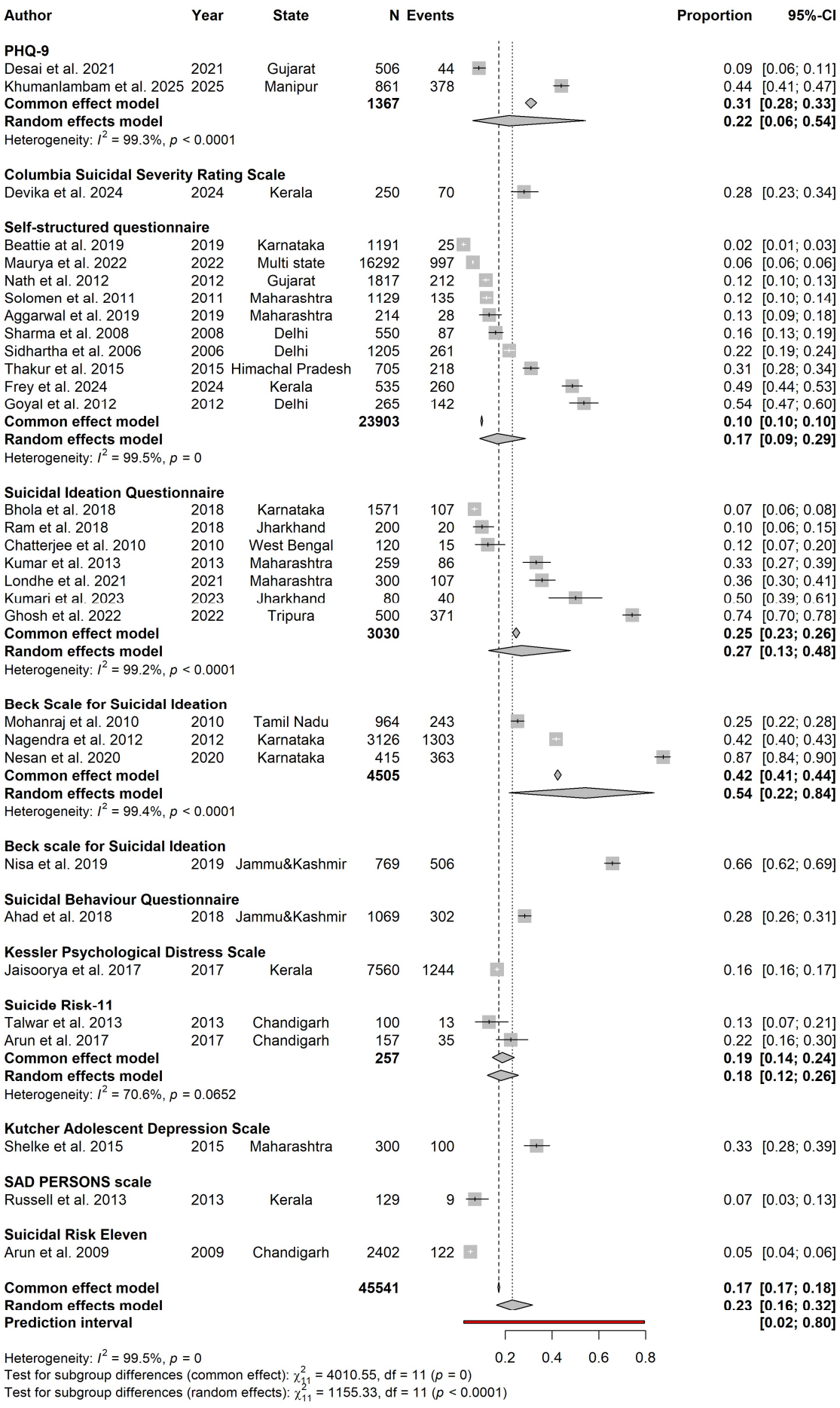

Figure 6: A forest plot displaying a subgroup assessment of the prevalence of suicidal ideation based on the kind of suicide assessment instrument employed in the research

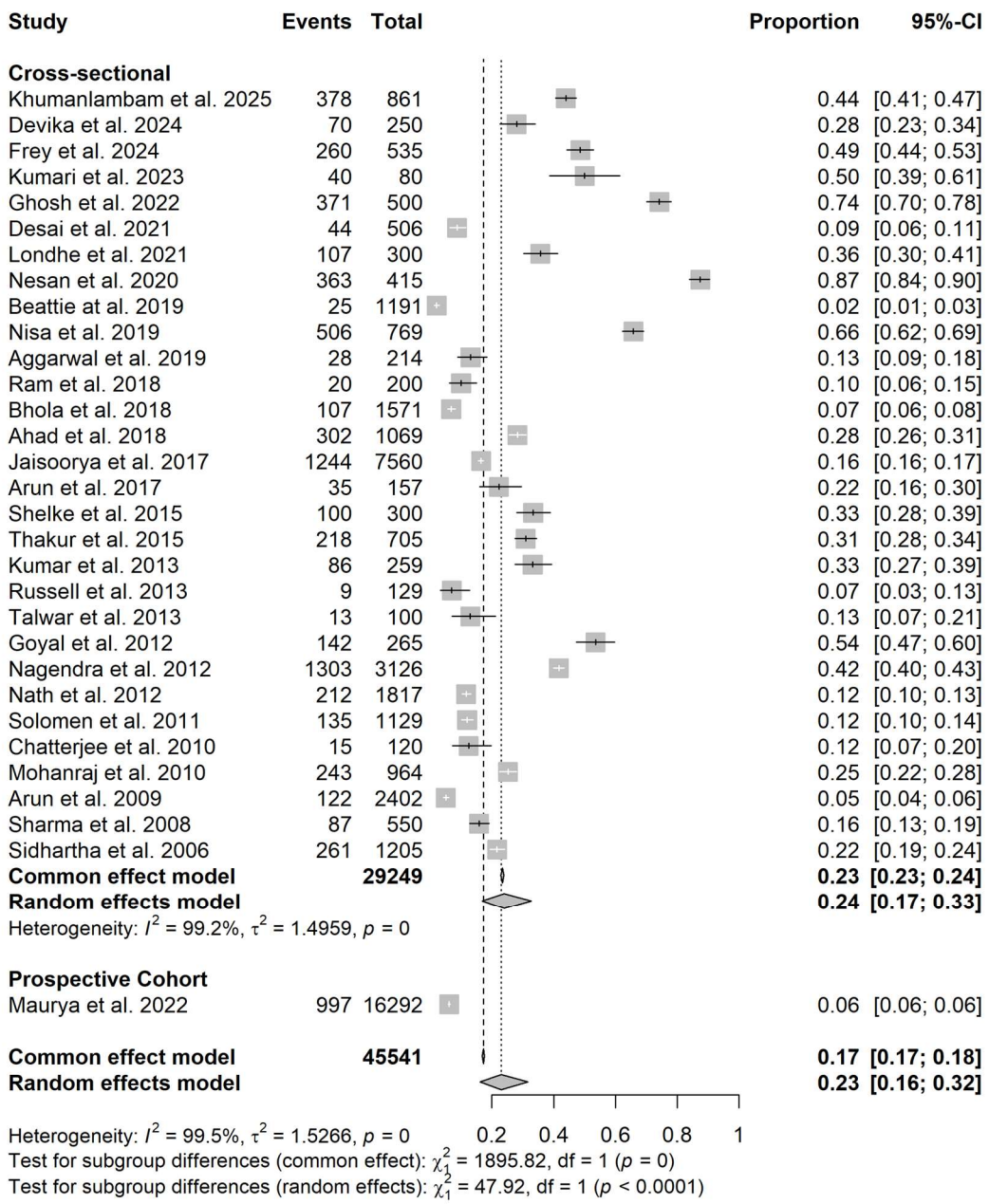

Figure 7: Forest plot displaying subgroup analysis of suicidal ideation prevalence by study type

Table 4. Results of mixed-effects meta-regression analyses for moderators of the logit-transformed proportion of suicidal ideation

Moderator	k	β (SE)	95% CI	z-value	p-value	R^2 (%)
Mean age (years)	17	0.178 (0.134)	-0.086 to 0.441	1.32	0.186	4.6
Publication year	31	0.068 (0.043)	-0.016 to 0.152	1.59	0.113	4.8
Sample size	31	-0.00001 (0.00001)	-0.00003 to 0.00000	-1.54	0.123	4.6

Meta-Regression Analysis: In meta-regression analyses (Table 4, Figures 8a-8c), mean age (β = 0.178, p = 0.186), publication year (β = 0.068, p = 0.113), and sample size (β = −0.00001, p = 0.123) were not statistically significant moderators of the logit-transformed proportion of suicidal ideation. Each moderator explained only a small proportion of heterogeneity (R^2 ≈ 4.6-4.8%).

Associated Factors: Meta-analyses of associated factors were conducted where ≥2 studies provided comparable odds ratios (ORs). The manuscript synthesizes several factors associated with suicidal ideation among Indian adolescents and young adults, drawing from meta-analyses across included studies. Female gender (Figure 9) is associated with higher odds compared to males (pooled OR 1.46, 95% CI 1.00-2.14, p=0.0518), and very high heterogeneity (I^2=90.7%). Rural residence (Figure 10) shows non-significantly lower odds relative to urban areas (pooled OR 0.82, 95% CI 0.47-1.44; p>0.05 as CI includes 1), with high heterogeneity (I^2=82.1%, p=0.0002 for heterogeneity test).

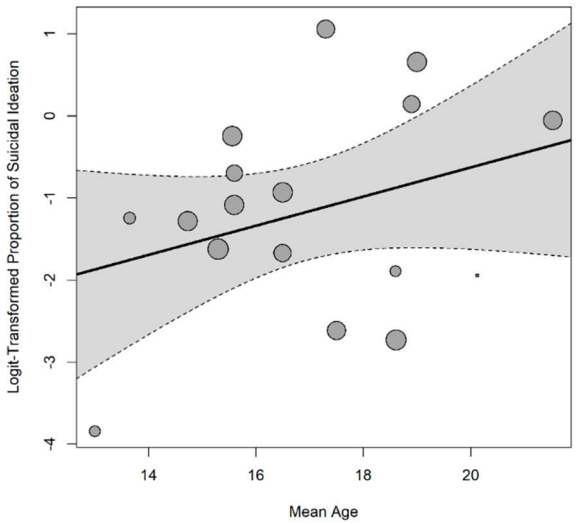

Figure 8a: Bubble Plot displaying a meta-regression of the frequency of suicidal thoughts based on the average age of Indian adolescents

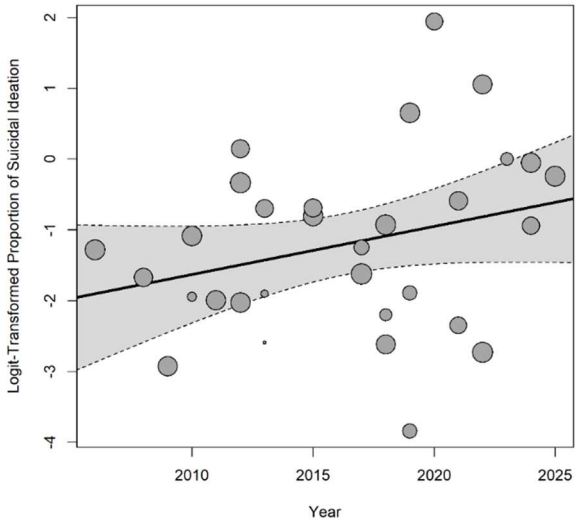

Figure 8b: Bubble Plot displaying a meta-regression study of suicidal ideation prevalence by publication year

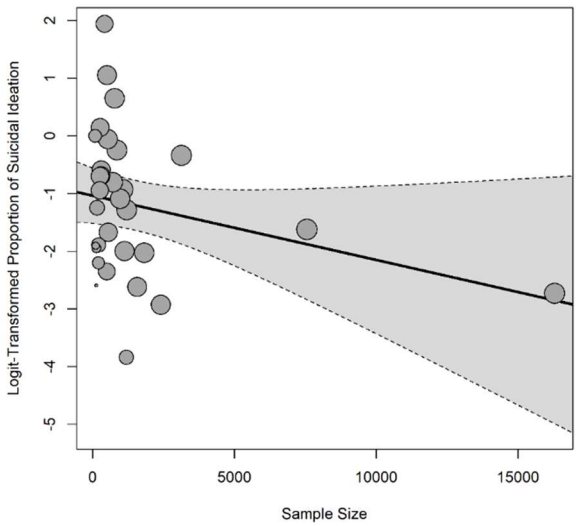

Figure 8c: Bubble Plot displaying the sample size-dependent meta-regression evaluation of the proportion of suicidal ideation

Academic stress (Figure 11) is linked to increased risk (pooled OR 1.69, 95% CI 0.81-3.53; p>0.05 as CI includes 1), exhibiting moderate heterogeneity (I^2=58.5%, p=0.0648 for heterogeneity test). Bad Academic performance (Figure 12) is significantly linked to increased risk (pooled OR 1.62, 95% CI 1.15-2.28), exhibiting moderate heterogeneity (I^2=43.1%) (p=0.0176, CI > 1). Other risk factors include such as bad peer connection (Figure 13) (pooled OR 1.37, 95% CI 0.85-2.19; I^2=50%, p=0.1117), bullying (Figure 14) (pooled OR 2.34, 95% CI 1.68-3.25; I^2=3.9%, p=0.13732), caste (tribal vs. non-tribal) (Figure 15) (pooled OR 1.12, 95% CI 0.72-1.75; I^2=46.7%, p=0.1312), economic issues (Figure 16) (pooled OR 1.16, 95% CI 1.08-1.24; I^2=0%, CI entirely excludes 1.0, p=0.001), family issues (Figure 17) (pooled OR 2.34, 95% CI 1.48-3.71; I^2=84.5%, p<0.0001), mental health problems (Figure 18) (pooled OR 2.48, 95% CI 1.47-4.21; I^2=95.1%, p=0.0001), parents' unemployment (Figure 19) (pooled OR 0.82, 95% CI 0.10-6.49; I^2=81.4%, p=0.0047) and absence of school attendance and orphanhood (insufficient data precluded meaningful meta-analysis for these factors). These findings highlight a substantial burden of suicidal behaviors in this population, driven by high heterogeneity from methodological, regional, and measurement differences, with sensitivity analyses (e.g., excluding high-bias studies) yielding similar results for SI at 22% (95% CI: 15-30%) and attempts at 3% (95% CI: 2-5%).

Sensitivity Analysis:

Sensitivity analyses were performed to assess the robustness of the findings. Exclusion of five high-risk-of-bias studies yielded nearly identical pooled estimates: suicidal ideation 22% (95% CI 15-30%) and suicide attempts 3% (95% CI 2-5%). Removal of the retrospective medico-legal study (Vidhate et al., 2022)[25] produced no change in pooled prevalences. Exclusion of statistical outliers (Kumari et al.,[22] 2023 and Frey et al.,[5] 2024) slightly lowered suicidal ideation prevalence to 20% (95% CI 14-27%), while suicide attempts remained 3%. Use of the logit transformation instead of the Freeman-Tukey method gave consistent results (suicidal ideation 21%, 95% CI 14-29%). Overall, the primary findings were robust across sensitivity analyses.

Publication Bias:

Egger's test (p=0.02) and Begg's test (p=0.03) supported the asymmetry shown in funnel plots for SI prevalence (Figure 20), indicating possible publication bias towards studies with higher prevalence. With non-significant trials (Egger's p=0.15; Begg's p=0.12), the plot for attempts was more symmetric (Figure 21). Five hypothetical studies were added by trim-and-fill adjustment for SI, bringing the pooled prevalence down to 19% (95% CI: 13%-26%). In fewer studies, bias was not apparent for related factors.

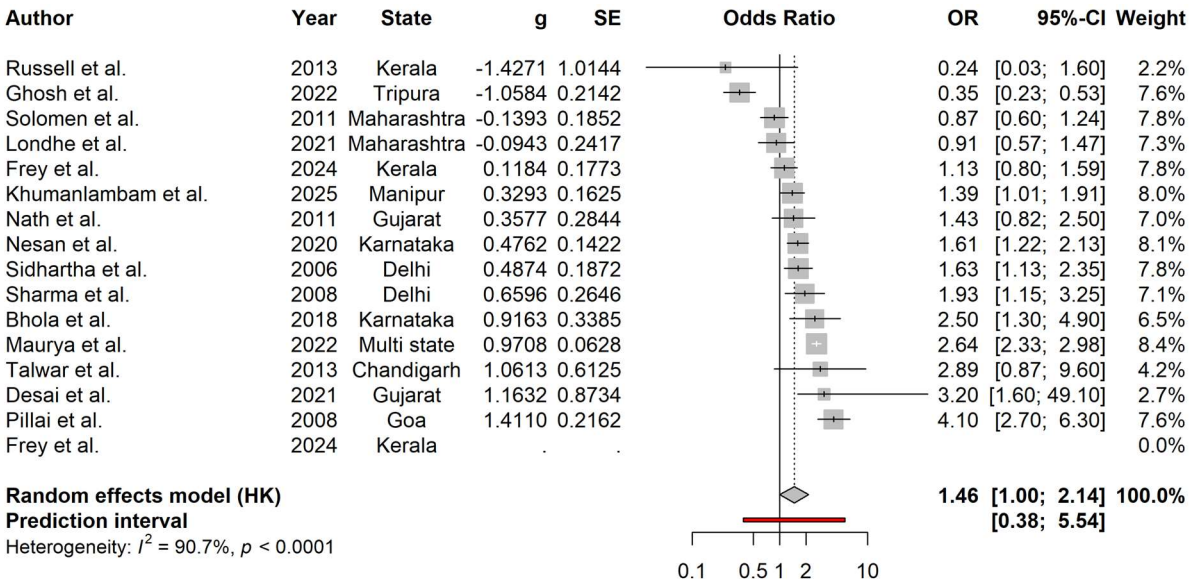

Figure 9: A forest plot illustrating the relationship between teenage suicidal ideation prevalence and gender (females vs. males)

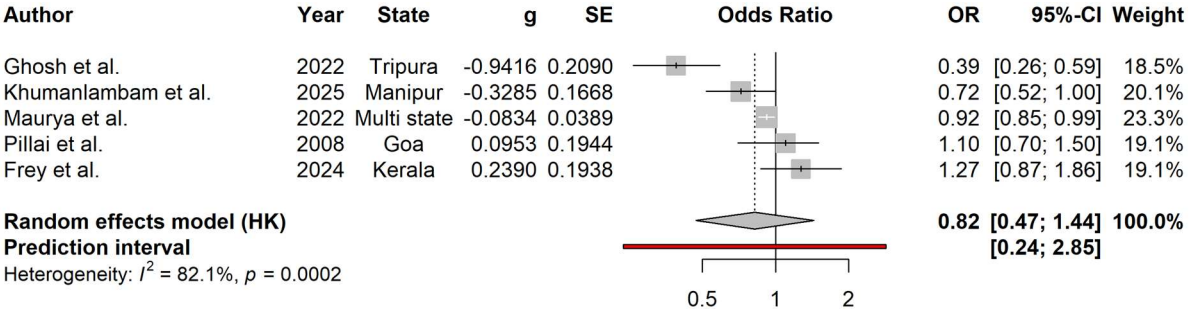

Figure 10: A forest plot illustrating the relationship between adolescent suicidal ideation prevalence and area type (rural vs. urban)

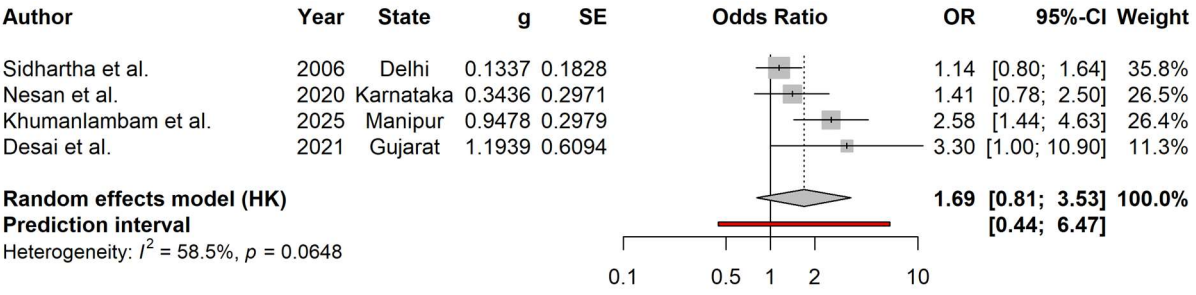

Figure 11: A forest plot illustrating the relationship between academic stress and the frequency of suicidal thoughts in adolescents

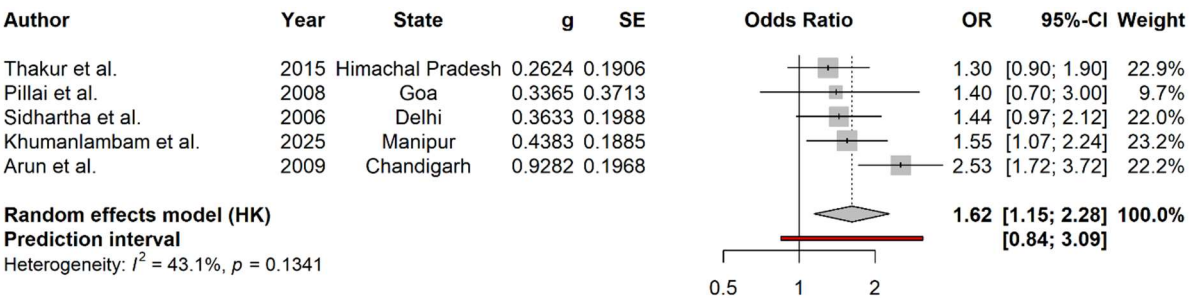

Figure 12: A forest plot demonstrating the association between teenage suicidal ideation frequency and poor academic performance

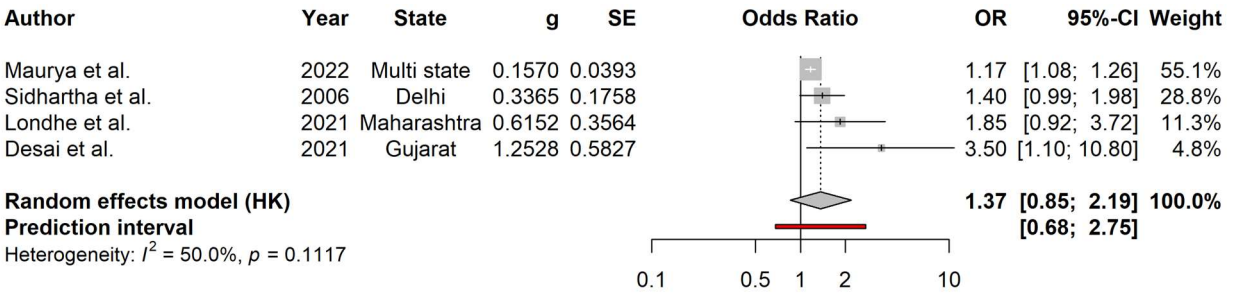

Figure 13: A forest plot demonstrating the association between adolescent suicidal ideation prevalence and poor peer connections

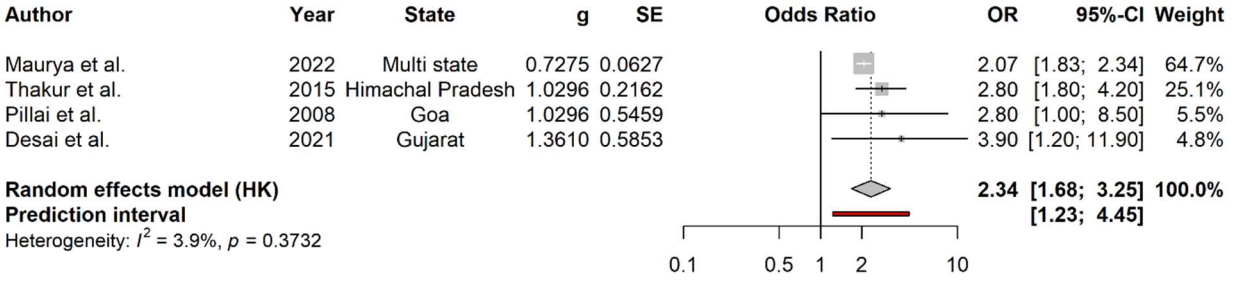

Figure 14: A forest plot illustrating the association between bullying and the frequency of suicidal thoughts in adolescents

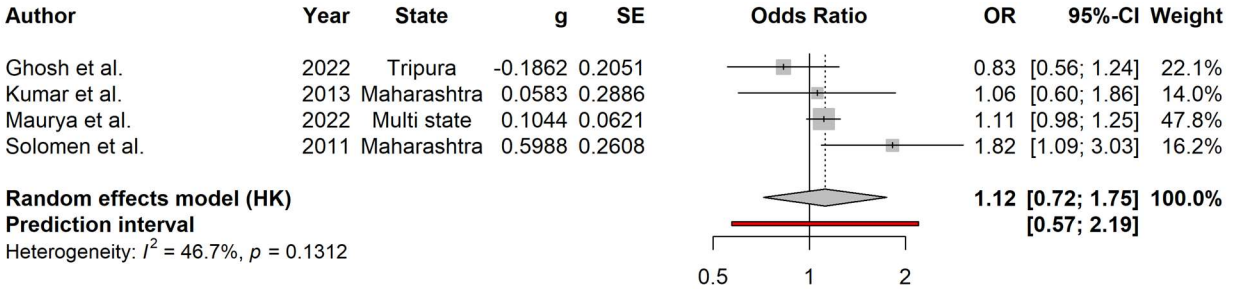

Figure 15: A forest plot illustrating the relationship between teenage suicidal ideation prevalence and caste (tribal vs. non-tribal)

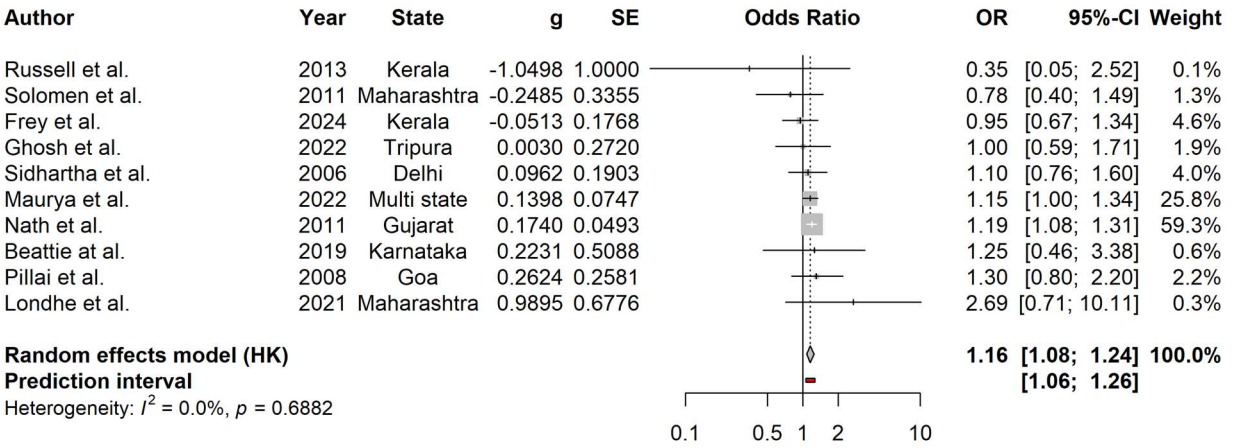

Figure 16: A forest plot illustrating the association between adolescent suicidal ideation prevalence and economic problems

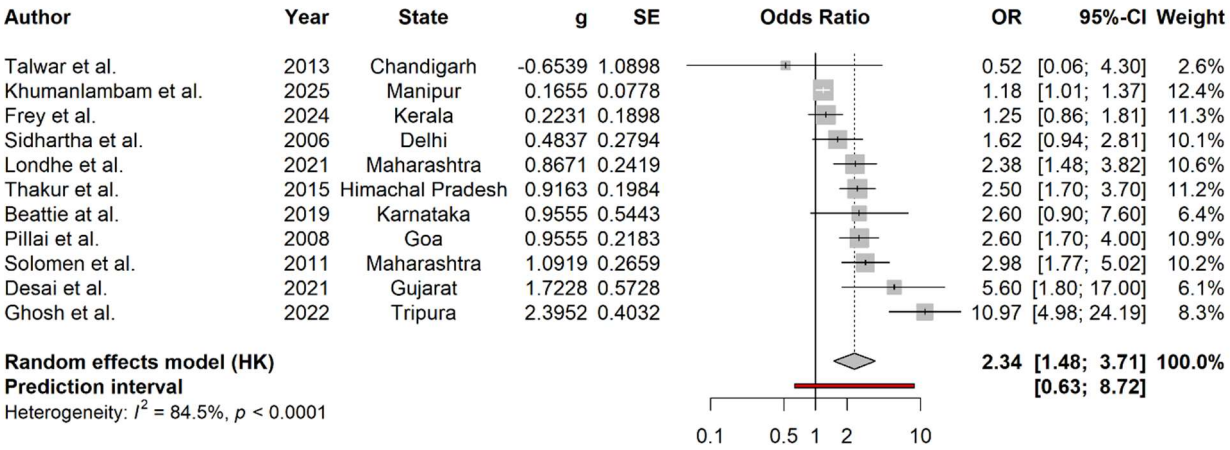

Figure 17: A forest plot illustrating the association between adolescent suicidal ideation prevalence and family problems

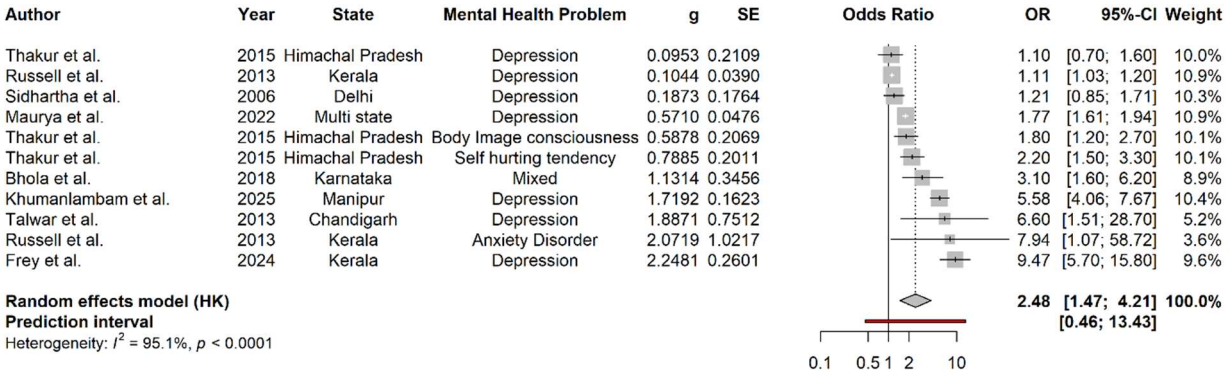

Figure 18: A forest plot illustrating the association between adolescent mental health problems and the frequency of suicidal Ideation

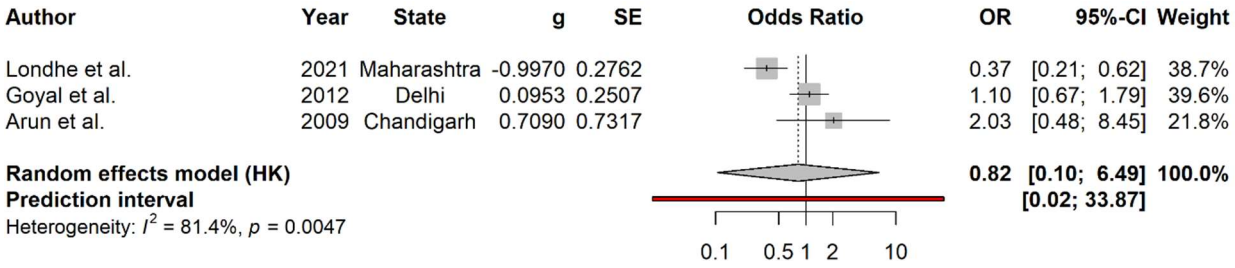

Figure 19: A forest plot demonstrating the association between teenage suicidal ideation incidence and parents' unemployment

Certainty of evidence using GRADE Assessment: The certainty of evidence was assessed using the GRADE approach.[19] All included studies were observational, so the initial rating was Low. Suicidal ideation (31 studies, n=45,541) was rated Low due to serious risk of bias, very serious inconsistency (I^2=99.5%), and serious publication bias.[5,20-24,26-47,49-51] Suicide attempts (11 studies, n=26,093) were rated **as of low certainty**.[23,25,29,30,32,43,45,48,49,50,51] Although the pooled estimate showed a relatively narrow confidence interval, no GRADE upgrading criteria (large magnitude of effect, dose-response gradient, or residual confounding reducing the effect) were met. The certainty remained low due to the serious risk of bias and inconsistency.

DISCUSSION

This systematic review and meta-analysis synthesise evidence from 33 observational studies involving approximately 45,541 participants for suicidal ideation and 26,093 for suicide attempts. It reveals a pooled prevalence of suicidal ideation of 23% and suicide attempts of 3% among Indian adolescents and young adults aged 10-24 years. These estimates indicate that roughly one in four to five young people experiences suicidal ideation, while one in 33 reports an actual attempt. Extreme heterogeneity (I^2 >95% for both outcomes) reflects differences in measurement tools, regional contexts, study designs, and populations.

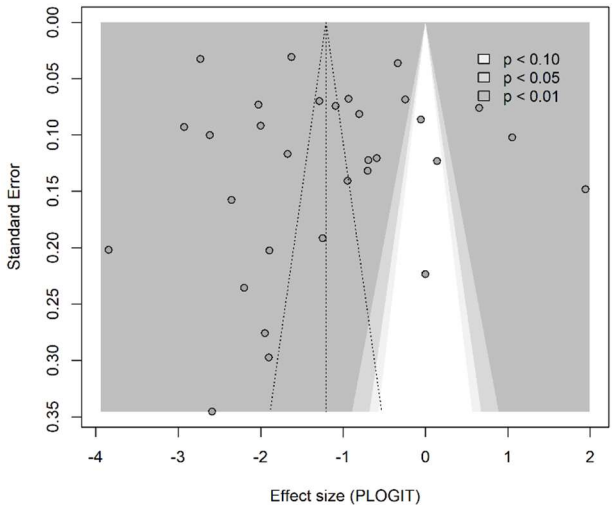

Figure 20: Contour-enhanced Funnel Plot illustrating publication bias on the frequency of suicide thoughts in Indian adolescents

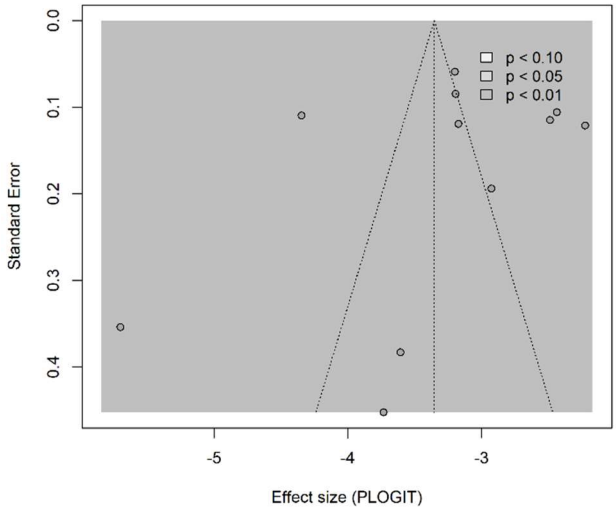

Figure 21: Contour-enhanced Funnel Plot illustrating publication bias on the frequency of suicide attempts among Indian adolescents

Table 5. GRADE Summary of Findings: Prevalence of suicidal ideation and suicide attempts among Indian adolescents and young adults (10-24 years)

Outcome	No. of studies	No. of participants	Pooled prevalence (95% CI)	Certainty (GRADE)	Reasons
Suicidal ideation	31	45,541	23% (16-32%)	Low	Serious risk of bias; Very serious inconsistency (I^2 = 99.5%); Serious publication bias; No upgrading factors
Suicide attempts	11	26,093	3% (2-6%)	Low	Serious risk of bias; Serious inconsistency (I^2 = 96.8%); No upgrading factors (no large effect size, dose-response, or residual confounding)

Subgroup analyses showed clear regional variation, with the highest ideation prevalence in the Northeast (34%) and North (25%). Rates were similar in school (26%) and college (25%) settings but lower in community samples (12%). Standardised scales (Beck Scale or Suicidal Ideation Questionnaire) yielded higher estimates than single-item tools. Gender differences were inconsistent: higher ideation among females was noted in multiple studies (e.g., Goyal et al.,[44] 2012; Desai et al.,[27] 2021; Nath et al.,[43] 2012), whereas Ghosh et al.[24] (2022) and Kumari et al.[23] (2023) reported higher rates among males, and Solomon et al.[45] (2011) found no significant difference. Similarly, lifetime prevalence exceeded past-year/recent estimates where stratified (e.g., Sidhartha et al.,[51] 2006: 21.7% lifetime vs. 11.7% past-year; Desai et al.,[27] 2021: 9% past 2 weeks). These findings underscore methodological and contextual sources of heterogeneity and support the value of narrative synthesis alongside pooled estimates.

Meta-regression confirmed that prevalence increased with older mean age, more recent publication year, and smaller sample size, consistent with evolving stressors and methodological influences.

The meta-analysis of associated factors revealed a nuanced pattern of risk. Several factors demonstrated statistically significant associations with suicidal ideation, including poor academic performance (OR 1.62, 95% CI 1.15-2.28), economic issues (OR 1.16, 95% CI 1.08-1.24), family problems (OR 2.34, 95% CI 1.48-3.71), mental health problems (OR 2.48, 95% CI 1.47-4.21), and bullying (OR 2.34, 95% CI 1.68-3.25). These findings highlight the central role of psychosocial adversity, mental health burden, and adverse interpersonal environments in shaping suicidal vulnerability among Indian adolescents.

In contrast, several examined variables did not show statistically significant associations, including academic stress (OR 1.69, 95% CI 0.81-3.53), rural residence (OR 0.82, 95% CI 0.47-1.44), poor peer connection (OR 1.37, 95% CI 0.85-2.19), and caste (tribal vs. non-tribal; OR 1.12, 95% CI 0.72-1.75), as their confidence intervals crossed unity. Female gender was associated with higher odds of suicidal ideation compared to males (pooled OR 1.46, 95% CI 1.00-2.14), though this estimate should be interpreted with considerable caution due to very high heterogeneity (I^2=90.7%).

The non-significant findings should be interpreted cautiously, as they may reflect substantial between-study heterogeneity, limited statistical power, or variability in measurement definitions rather than the true absence of effect. Notably, academic stress although widely reported in individual studies did not retain statistical significance in pooled analysis, sug-

gesting potential confounding or indirect pathways (e.g., mediation through depression).

Sensitivity analyses excluding high-risk-of-bias studies yielded nearly identical pooled estimates (suicidal ideation 22%; attempts 3%), confirming robustness. Outlier studies (e.g., Kumari et al.[22] 95% and Frey et al.[5] 48.7%) did not materially alter the overall findings after Freeman-Tukey transformation and sensitivity testing.

These results align with and extend previous syntheses. Sahoo et al. (2023)[8] reported 11% ideation prevalence, while our updated estimate of 23% suggests a rising trend. Senapati et al. (2024)[6] and Jena et al. (2024)[52] similarly highlighted academic stress, family conflict, and mental health problems as consistent risk factors, with notable Northeast and female predominance. Arya et al. (2025)[7] documented increasing completed-suicide rates among adolescents, and Praharaj et al. (2026)[9] reported post-COVID rises in ideation and attempts, mirroring our meta-regression on publication year and associations with loneliness and academic pressure. Compared with global low- and middle-income country data (Uddin et al. 16.9% ideation),[53] India's burden appears disproportionately high, likely driven by unique sociocultural and academic pressures.

Strengths

Strict compliance to PRISMA 2020 rules is one of this review's strengths, prospective PROSPERO registration, comprehensive multi-database searching, random-effects modelling with Freeman-Tukey transformation, and pre-planned subgroup and meta-regression analyses. GRADE assessments rated the certainty of evidence as low for prevalence estimates and very low for associated factors, primarily due to inconsistency and imprecision.

Limitations

High heterogeneity limits the precision of pooled estimates. Most studies were cross-sectional, precluding causal inference. English-language restriction may have missed important studies published in Hindi, Tamil, Telugu, Marathi, Bengali, or other regional languages. Many studies relied on non-random sampling or unvalidated tools, and publication bias was evident for ideation prevalence (Egger's p=0.02). The Google Scholar search was limited to the first 200-300 results for practicality; although reference lists were hand-searched, some eligible studies may have been overlooked. Finally, the Freeman-Tukey transformation can be unstable at extreme prevalences (e.g., 95%), although sensitivity analyses showed robustness.

The high prevalence of suicidal ideation and attempts constitutes a serious public health crisis among Indian adolescents and young adults. Urgent multi-sectoral action is required, including routine mental health screening in schools and colleges using validated tools, counselling programmes to reduce academic stress, family-support initiatives, anti-bullying interventions, and region-specific programmes targeting high-burden areas such as the Northeast. Gender-sensitive approaches are particularly important given the consistent predominance of women. Future research should prioritise longitudinal designs, standardised measurement tools, and exploration of emerging factors such as social media use to establish temporality and refine prevention strategies.

Conclusion

Suicidal ideation affects a substantial proportion of the adolescent group roughly one in four to five individuals while attempts, though far less common, remain a serious concern. The burden is notably higher among school and college students than in community samples, with the highest rates in the Northeast and North. Recent studies and older adolescents tend to report elevated levels. Major risk factors include female gender, family conflicts, mental health problems, bullying, academic stress, poor academic performance, and socioeconomic pressures. Supportive parental communication and positive peer/teacher relationships appear protective. These results update and extend earlier reviews, showing a likely upward trend in suicidal thoughts and behaviors, particularly post-COVID, driven by academic, familial, psychological, and emerging digital stressors. India faces an urgent public health challenge. Prevention demands integrated action: routine mental health screening in schools, counseling to reduce academic and emotional stress, family support programs, targeted interventions for high-risk groups (especially girls and high-prevalence regions), and efforts to curb bullying while building safe, supportive environments. Coordinated, multi-sectoral interventions are essential to reverse rising trends and protect this vulnerable population. Longitudinal studies with standardized methods are needed to track progress and refine prevention strategies.

Authority for Registration: The review protocol was prospectively registered with PROSPERO (CRD420261339999).

Individual Authors' Contributions: **BG**, **LB**, and **KG**: the article's idea, layout, and typological reasoning. **BG**, **AM**, and **KG**: data collection and literature selection. **BG**, **AM**, and **LB**: data interpretation and analysis; article editing. **KG**, **AM**, **PG** and **LB**: supervision of the study and paper revision. The submitted version of the article was approved by all authors who contributed to it.

Availability of Data: Although the datasets created for this work are not publicly accessible, they can be obtained from the authors upon reasonable request.

The R code used for all meta-analyses is also available from the corresponding author on reasonable request.

Declaration of Non-use of Generative AI: This article was prepared without the use of generative AI tools for content creation, analysis, or data generation. All findings and interpretations are based solely on the authors' independent work and expertise.

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