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Child and Adolescent Bullying Victimization and Anxiety Outcomes: A Systematic Review and Meta-Analysis of Observational Studies

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ADMINISTRATIVE INFORMATION

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Review Stage at time of this submission - Completed but not published.

Conflicts of interest - None declared.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 22 September 2026 and was last updated on 22 September 2026.

INTRODUCTION

Review question / Objective This systematic review and meta-analysis aims to determine the magnitude and consistency of the association between bullying victimization, including eligible bullying-relevant forms of peer victimization, and anxiety outcomes among children and adolescents.

Using the PICOS framework:

Population (P): Children and adolescents younger than 19 years, including school-based populations with identifiable eligible youth subgroups.

Exposure (I/E): Bullying victimization, including traditional, physical, verbal, relational, social, and cyberbullying victimization. Studies using broader peer-victimization measures are eligible when the

exposure represents bullying-relevant interpersonal victimization.

Comparator (C): Non-victimized participants or those with lower levels of victimization for dichotomous comparisons; continuous exposure measures are also eligible for correlation- or regression-based analyses.

Outcomes (O): Anxiety-specific outcomes, including clinician- or interview-defined anxiety disorders, validated or algorithm-defined anxiety thresholds, and continuous anxiety symptom measures such as general anxiety, generalized anxiety, social anxiety, and fear of negative evaluation.

Study design (S): Cross-sectional and prospective observational studies reporting extractable adjusted odds ratios, Pearson correlation

coefficients, standardized regression coefficients, or data permitting calculation of standardized mean differences.

The review also examines whether associations differ according to study design, exposure definition, anxiety phenotype, and effect-size family, and assesses robustness through sensitivity analyses using progressively stricter exposure eligibility criteria.

Condition being studied Bullying victimization is a common adverse interpersonal experience during childhood and adolescence and is increasingly recognized as an important public mental health concern. It generally refers to repeated or persistent intentional aggression, exclusion, intimidation, or harm occurring within peer relationships characterized by an actual or perceived imbalance of power. Related forms include traditional face-to-face bullying, physical or verbal bullying, relational or social victimization, cyberbullying, and other bullying-relevant forms of peer victimization.

The health condition of interest in this review is anxiety among children and adolescents exposed to bullying or bullying-relevant peer victimization. Anxiety outcomes may include clinically or interview-defined anxiety disorders, validated scale-based anxiety thresholds, and continuous anxiety symptom measures. These outcomes encompass general anxiety, generalized anxiety, social anxiety, fear of negative evaluation, and related anxiety-specific manifestations. Although these outcomes belong to a broader anxiety domain, they are not considered fully interchangeable because they may represent different anxiety phenotypes and may arise through partly distinct developmental pathways.

Bullying victimization may be associated with anxiety through repeated exposure to interpersonal threat, humiliation, rejection, or social exclusion, which may contribute to heightened threat sensitivity, anticipatory worry, avoidance, and impaired social functioning. At the same time, pre-existing anxiety or social withdrawal may increase vulnerability to subsequent victimization. Therefore, the condition under study is best understood as an observational association between bullying victimization and anxiety outcomes rather than as a simple unidirectional causal relationship.

This review evaluates the magnitude, consistency, and heterogeneity of this association across

different study designs, exposure definitions, anxiety outcomes, and effect-size types.

METHODS

Participant or population Children and adolescents younger than 19 years will be included. Eligible participants may be drawn from school-based, community-based, population-based, or clinical settings. Studies including broader age ranges will be eligible only when data for children or adolescents can be identified separately or when the sample is predominantly composed of participants within the eligible age range.

The review will include participants exposed to bullying victimization or bullying-relevant peer victimization, including traditional, physical, verbal, relational, social, and cyber forms of victimization. Both general-population samples and specific subgroups, such as clinically referred or otherwise defined adolescent populations, may be included provided that the exposure and anxiety outcomes meet the prespecified eligibility criteria.

Studies restricted exclusively to adults will be excluded.

Intervention Not applicable as a therapeutic intervention. This review evaluates bullying victimization or bullying-relevant peer victimization as the exposure of interest in observational studies.

Eligible exposures include traditional, physical, verbal, relational, social, and cyberbullying victimization, as well as broader peer-victimization measures when they clearly represent bullying-relevant interpersonal victimization. Studies may define exposure dichotomously, such as victimized versus non-victimized participants, or continuously according to frequency or severity.

Where studies report multiple exposure levels, the estimate most consistent with the prespecified target exposure will be selected for the relevant meta-analytic model to avoid double-counting participants.

Comparator For dichotomous direct-comparison analyses, the comparator will be participants who are not exposed to bullying victimization or who belong to a clearly defined lower-exposure reference group.

Where studies assess bullying or peer victimization as a continuous exposure, no separate categorical

comparator is required; associations will instead be evaluated using correlation or regression-based effect estimates.

For studies with multiple exposure categories, the comparison most consistent with the prespecified target estimand will be selected, with preference for victimized versus non-victimized groups where available.

Study designs to be included Eligible studies will include observational cross-sectional and prospective longitudinal/cohort studies evaluating the association between bullying or bullying-relevant peer victimization and anxiety outcomes in children or adolescents. Studies must report at least one extractable prespecified quantitative effect estimate, such as an adjusted odds ratio, Pearson correlation coefficient, standardized regression coefficient, or data permitting calculation of Hedges g .

Eligibility criteria Additional eligibility criteria were as follows. Studies had to report an anxiety-specific outcome and at least one extractable quantitative effect estimate. Broader peer-victimization studies were eligible only when the exposure represented bullying-relevant interpersonal victimization. Reviews, protocols, qualitative studies, case reports, adult-only studies, intervention studies without eligible observational associations, studies combining victimization with perpetration without separable data, and studies without extractable anxiety-specific estimates were excluded.

Information sources The following information sources will be searched from database inception to July 29, 2026: PubMed, Embase, Web of Science Core Collection, the Cochrane Library, and Scopus. Search strategies will combine controlled vocabulary and free-text terms relating to bullying or peer victimization, children or adolescents, and anxiety outcomes, with database-specific syntax and field tags.

In addition, the reference lists of relevant systematic reviews, meta-analyses, and eligible full-text articles will be manually screened to identify potentially eligible studies not captured by the electronic database searches. An updated supplementary search will also be conducted before finalization of the review to identify newly published studies.

The complete reproducible search strategies, exact search dates, Boolean operators, field tags, and any database-specific limits will be

documented in Appendix 1. Grey literature, trial registries, and unpublished datasets will not be searched unless they are identified through the supplementary search process.

Main outcome(s) The primary outcome is the association between bullying victimization or bullying-relevant peer victimization and anxiety-specific outcomes in children and adolescents.

For dichotomous anxiety outcomes, the main effect measure will be the adjusted odds ratio (OR) with 95% confidence interval (CI) comparing victimized participants with non-victimized or lower-exposure groups. Cross-sectional and prospective ORs will be analyzed separately because they represent different temporal relationships.

Eligible anxiety outcomes include clinician- or structured-interview-defined anxiety disorders, validated or algorithm-defined anxiety thresholds, and clearly defined anxiety-specific phenotypes such as generalized anxiety and social anxiety.

For continuous anxiety outcomes, effect estimates will be synthesized separately by effect-size family, including Pearson correlation coefficients (r), standardized regression coefficients (β), and standardized mean differences expressed as Hedges g . These effect types will not be converted into a single common metric.

Where prospective studies are included, anxiety outcomes measured at the reported follow-up point after baseline victimization assessment will be used; follow-up duration will be extracted and reported. Heterogeneity, 95% prediction intervals where appropriate, and sensitivity analyses based on progressively stricter exposure definitions will also be evaluated.

Quality assessment / Risk of bias analysis

Cross-sectional studies will be assessed using the Joanna Briggs Institute (JBI) Critical Appraisal Checklist for Analytical Cross-Sectional Studies, which evaluates eight domains: clarity of inclusion criteria, description of participants and setting, validity and reliability of exposure measurement, use of objective and standardized outcome criteria, identification of confounding factors, strategies to address confounding, validity and reliability of outcome measurement, and appropriateness of statistical analysis.

Prospective longitudinal/cohort studies will be assessed using the Newcastle–Ottawa Scale (NOS), covering participant selection,

comparability of exposed and non-exposed groups, outcome assessment, and adequacy and completeness of follow-up.

Item-level judgments will be retained and reported rather than relying solely on total scores. Particular attention will be given to exposure measurement, control of confounding, outcome ascertainment, representativeness, and attrition. Quality assessments will be used to support interpretation of the robustness and limitations of the evidence rather than to exclude studies solely on the basis of an overall score.

Strategy of data synthesis Data will be synthesized separately according to study design and effect-size family. Adjusted odds ratios (ORs) will be analyzed on the natural logarithmic scale, with cross-sectional and prospective studies pooled separately. Random-effects meta-analysis will be performed using restricted maximum likelihood estimation, with Hartung–Knapp adjustment for pooled confidence intervals. When necessary, the standard error of log(OR) will be derived from the reported 95% CI.

Pearson correlation coefficients will be transformed using Fisher's z transformation before pooling and back-transformed for presentation. Standardized regression coefficients (β) will be synthesized separately using inverse-variance weighting. Hedges g estimates will be analyzed as standardized mean differences and will not be combined with ORs, correlations, or standardized β coefficients.

Statistical heterogeneity will be assessed using τ^2 , Cochran's Q, and I^2 , and 95% prediction intervals will be reported where appropriate. Sensitivity analyses will include broader and strict cross-sectional eligibility definitions and leave-one-out analyses of the primary cross-sectional OR model. Studies contributing multiple strata or exposure levels will be combined or selected according to prespecified rules to avoid double counting. Publication-bias tests or meta-regression will not be emphasized when the number of studies is insufficient for reliable inference. All pooled estimates will be interpreted as observational associations rather than causal effects.

Subgroup analysis Subgroup analyses will be conducted where sufficient data are available. Prespecified subgrouping factors include study design (cross-sectional vs prospective), type of victimization (traditional, relational/social, cyber, or broader peer victimization), and anxiety phenotype (general anxiety, generalized anxiety, social anxiety,

fear of negative evaluation, scale-defined thresholds, or clinically/interview-defined anxiety outcomes).

Because the number of studies within many potential subgroups is expected to be small, formal subgroup meta-analysis will only be performed when there are enough independent studies to permit meaningful comparison. Otherwise, subgroup patterns will be described qualitatively. Differences according to developmental stage, study setting, exposure definition, informant, and adjustment strategy will also be considered descriptively when supported by the available data.

Sensitivity analyses using broader and stricter exposure eligibility criteria will complement subgroup analyses by examining whether pooled estimates are robust to variation in the operational definition of bullying victimization.

Sensitivity analysis Sensitivity analyses will assess the robustness of the primary findings to alternative eligibility and analytic assumptions. For the cross-sectional adjusted OR analysis, two nested sensitivity models will be examined: a broader model including bullying and closely related peer-victimization constructs that remain conceptually relevant to the review question, and a strict model restricted to studies with the closest alignment to conventional bullying victimization and clearly defined anxiety-specific outcomes.

A leave-one-out analysis will also be performed for the primary cross-sectional OR model by sequentially excluding each study to determine whether the pooled estimate is disproportionately influenced by any single study. Where appropriate, the impact of studies with clinically selected populations, broader exposure definitions, or markedly different effect sizes will be examined descriptively.

Prospective studies will be analyzed separately from cross-sectional studies because of their different temporal structure. Continuous anxiety outcomes will remain stratified by effect-size family and will not be converted into a common metric.

Sensitivity results will be interpreted according to the direction and magnitude of pooled estimates, heterogeneity, confidence intervals, and prediction intervals where estimable. Particular attention will be given to whether conclusions change materially under stricter exposure definitions or after exclusion of individual influential studies.

Country(ies) involved China.

Keywords bullying; peer victimization; anxiety disorders; children; adolescents; metaanalysis.

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