



Mindfulness-Based Interventions for Reducing Anxiety in Young Adults: A Systematic Literature Review

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ABSTRACT

Background: Anxiety can affect young adults' emotional well-being, academic engagement, and social functioning. Mindfulness-based interventions (MBIs) may help by strengthening present-moment awareness and reducing reactive responses to anxious thoughts and sensations. Objective: This systematic literature review examined empirical evidence on the use of MBIs to reduce anxiety among young adults. Methods: The review was designed in accordance with PRISMA 2020. Studies published from 2016 to 2025 were sought in Scopus, Web of Science, PubMed, PsycINFO, ERIC, ScienceDirect, and Google Scholar. Eligible studies involved young adults, evaluated a mindfulness-based program, and reported anxiety outcomes. Thirteen articles were specified for inclusion, and findings were synthesized narratively because intervention formats, outcome measures, and comparison conditions varied. Results: The available evidence indicates that mindfulness programs may reduce anxiety, including when delivered online or in culturally adapted formats. Supporting meta-analyses of university student samples reported significant average effects: one found a standardized mean difference (SMD) of -0.47 (95% CI $[-0.80, -0.14]$) for online MBIs, while another reported an SMD of -0.35 (95% CI $[-0.46, -0.25]$) across mindfulness interventions. However, substantial heterogeneity in some reviews and differences in study quality limit generalization. Conclusion: MBIs appear promising as an approach to anxiety support for young adults, but their effectiveness may depend on program design, delivery, population, and measurement. Further rigorous studies with validated outcomes and longer follow-up are needed.

AUTHORS' CONTRIBUTION

- A. Conception and design of the study;
- B. Acquisition of data;
- C. Analysis and interpretation of data;
- D. Manuscript preparation;
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INTRODUCTION

Young adulthood is a developmental period marked by transitions in education, work, relationships, and personal independence. These changes can create sustained psychological demands, while anxiety may interfere with concentration, sleep, social functioning, and academic or occupational performance. University students are a particularly visible group within this age range: a synthesis of randomized controlled trials (RCTs) reported that mindfulness programs can improve anxiety and other psychological outcomes, although their effects vary with the type of comparison group and the quality of the evidence (Dawson et al., 2020; Johnson et al., 2023). Anxiety is not simply an isolated feeling of nervousness. It may involve persistent worry, heightened attention to possible threats, and difficulty



regulating emotional responses. These features can reinforce one another and make it harder to respond flexibly to daily stressors.

Mindfulness-based interventions (MBIs) offer one approach to addressing these processes. In this literature, mindfulness generally refers to attending to present-moment experience with awareness and an attitude of acceptance rather than immediate judgment or avoidance (Creswell, 2017). Programs may include mindfulness-based stress reduction (MBSR), mindfulness-based cognitive therapy (MBCT), meditation exercises, and structured online interventions. Their practices are intended to help participants notice thoughts and bodily sensations without automatically treating them as threats or facts. The proposed value for anxiety therefore lies not only in relaxation, but also in changes to attention, emotional regulation, and the relationship a person has with anxious thoughts (Gu et al., 2015; Tang et al., 2015).

Recent reviews and trials provide a substantial, though not uniform, evidence base. A meta-analysis of 11 studies involving 1,602 Chinese college students found an overall reduction in anxiety following mindfulness-based interventions. However, heterogeneity was very high, indicating that the estimated effect should be interpreted in light of differences among study populations, intervention formats, and research methods (Li et al., 2023). A broader review of 51 RCTs involving university students found small-to-moderate improvements in anxiety and other outcomes compared with passive controls. When MBIs were compared with active controls, benefits were narrower, including an improvement in state anxiety; the review also identified generally high risk of bias across trials (Dawson et al., 2020).

Other syntheses support the potential of mindfulness while pointing to limits in the evidence. In a meta-analysis of college and university students during the COVID-19 pandemic, MBIs were associated with a moderate improvement in anxiety (Hedges' $g = 0.612$), but substantial heterogeneity was again present (Reangsing et al., 2023). A review of MBSR trials among young people with anxiety symptoms likewise reported significant benefits, while noting the importance of intervention duration and the need for further evidence (Sun et al., 2020). A systematic review and meta-analysis focused on college undergraduates concluded that the strongest evidence among the outcomes examined concerned anxiety and depressive symptoms (Johnson et al., 2023). Together, these findings make mindfulness a promising intervention, but they do not support assuming a uniform effect across all young adults or programs.

Individual trials illustrate the range of approaches under study. An eight-week online mindfulness program was evaluated with university students experiencing pandemic-related difficulties, showing the growing use of digital delivery in this population (Dawson et al., 2021). Other studies have tested mobile health interventions and mindfulness applications, including trials with healthcare students and students in quarantine (Huberty et al., 2019; Sun et al., 2021; Valero et al., 2021). These formats may expand access, though their results depend on factors such as participant engagement, guidance, and comparison conditions. Research on brief programs has also examined anxiety alongside mindful awareness, suggesting that intervention length and outcomes deserve attention when comparing studies (Gallego et al., 2021).

The mechanisms that may connect mindfulness practice with reduced anxiety are also receiving attention. The Monitor and Acceptance Theory proposes that monitoring experience alone may increase awareness but does not necessarily reduce distress; acceptance may be necessary for monitoring to produce beneficial emotional outcomes (Lindsay & Creswell, 2017). Related accounts emphasize decentering the ability to observe thoughts and feelings as passing mental events rather than literal threats and changes in emotion regulation (Creswell, 2017; Gu et al., 2015; Vago & Silbersweig, 2012). Empirical work has linked emotion regulation with associations between mindfulness and anxiety symptoms (Desrosiers et al., 2017), while mechanism-focused research has examined whether mindfulness practice changes anxiety-related processes (Nassif & Wells, 2019). These perspectives provide a basis for considering not only whether anxiety changes, but how mindfulness might contribute to that change.

Evidence from Indonesia adds a locally relevant dimension. Researchers have described the cultural adaptation of an internet-delivered mindfulness program for Indonesian university students, addressing language, context, and participants' preferences (Listiyandini et al., 2023). A subsequent feasibility study evaluated a guided version of the culturally adapted program among Indonesian students experiencing psychological distress (Listiyandini et al., 2024). More recently, a randomized wait-list-controlled trial involving 156 Indonesian university students reported greater improvements in psychological distress and mindfulness in the guided intervention group than in the wait-list group (Listiyandini et al., 2025). While

distress measures included anxiety, these studies also show why cultural relevance, delivery format, and outcome measurement matter when applying findings across settings.

The existing literature contains several overlapping limitations. First, reviews differ in their population boundaries: some focus on university students, others on young people with anxiety symptoms, and still others on student mental health more broadly. As a result, their findings do not always isolate young adults as a distinct population or distinguish elevated everyday anxiety from clinically significant anxiety. Second, studies vary in intervention content, dose, delivery mode, facilitator involvement, and control condition. This variation makes it difficult to determine which intervention features are most consistently associated with anxiety reduction (Dawson et al., 2020; Li et al., 2023; Reangsing et al., 2023).

Third, reviews often combine anxiety with broader outcomes such as stress, depression, or general psychological distress. Such syntheses are useful, but they may leave uncertainty about anxiety as the primary outcome and about whether effects persist beyond the immediate post-intervention period. Finally, Indonesia-based research is developing, but the number of studies testing culturally adapted programs remains limited compared with the wider international literature (Listiyandini et al., 2023, 2024, 2025). A systematic synthesis can therefore help clarify what has been studied, where the evidence is strongest, and which questions remain open for research and practice.

This systematic literature review aims to examine empirical research published during the last decade on mindfulness-based interventions to reduce anxiety among young adults. Specifically, it will synthesize evidence on intervention approaches and delivery formats, anxiety outcomes, and methodological or contextual factors that may help explain differences among findings. Its contribution is to bring together literature that is otherwise divided across reviews of university students, young people with anxiety symptoms, online mindfulness programs, and culturally adapted interventions. By keeping anxiety in focus while considering intervention and population characteristics, the review seeks to provide a clearer basis for interpreting current evidence and identifying priorities for future research, including work relevant to Indonesian young adults.

Overall, mindfulness-based interventions show promise for reducing anxiety among young people and university students, yet variation in populations, interventions, comparison groups, and study quality limits broad conclusions. A systematic synthesis focused on young adults can clarify the scope and strength of the available evidence and identify where further culturally responsive, methodologically rigorous research is needed.

METHODS

Study Design and Reporting Framework

This study was designed as a systematic literature review of mindfulness-based interventions for reducing anxiety among young adults. The review process was structured according to the PRISMA 2020 reporting guideline, which promotes transparent reporting of identification, screening, eligibility assessment, and inclusion (Page et al., 2021). Search reporting was guided by PRISMA-S (Rethlefsen et al., 2021), while the search and selection procedures drew on established evidence-synthesis guidance (Aromataris et al., 2024; Higgins et al., 2024). The review included 13 articles in the final qualitative synthesis.

Eligibility Criteria and Information Sources

Studies were considered eligible when they: (1) included young adults, defined for this review as participants aged 18–30 years or a sample with a clearly reported young-adult subgroup; (2) evaluated a mindfulness-based intervention, such as mindfulness-based stress reduction, mindfulness-based cognitive therapy, mindfulness meditation, or a structured mindfulness program delivered online or in person; (3) reported anxiety as an outcome using a validated instrument or clearly described measure; and (4) used an empirical quantitative or mixed-methods design with extractable findings. Studies were excluded if they did not evaluate an intervention, did not report anxiety outcomes, focused on populations outside the specified age range without separable results, or lacked sufficient full-text information. These criteria were set to make the population, intervention, comparison conditions, outcomes, and study designs explicit, consistent with systematic review practice (Higgins et al., 2024; Aromataris et al., 2024).

The search strategy covered literature published from January 2016 to December 2025. Scopus, Web of Science, PubMed, PsycINFO, ERIC, ScienceDirect, and Google Scholar were selected to retrieve multidisciplinary research in psychology, health, and education. Search terms combined keywords and Boolean operators, including mindfulness, mindfulness-based intervention, MBSR, MBCT, anxiety, young adults, college students, and university students. Search syntax was adapted to each database, and reference lists of relevant reviews and included articles were checked to identify additional eligible studies. Recording databases, search terms, and search dates supports reproducibility and completeness (Bramer et al., 2018; Rethlefsen et al., 2021).

Selection, Data Extraction, and Quality Appraisal

Records were exported to a reference-management file and duplicates were removed before screening. Two reviewers independently screened titles and abstracts, then assessed potentially eligible full texts against the inclusion criteria. Disagreements were resolved through discussion, with a third reviewer consulted when consensus could not be reached. The selection process and reasons for full-text exclusion were documented in a PRISMA 2020 flow diagram (Page et al., 2024). The diagram supplied with this manuscript shows illustrative search-flow counts that lead to 13 included articles; all counts before the final sample must be checked against the actual database search and screening records before submission. A standardized extraction form was used to record author and year, country, sample size and age, intervention components and duration, delivery mode, comparator, anxiety measure, assessment time points, and key findings. Study quality and risk of bias were assessed using the Cochrane RoB 2 tool for randomized trials and ROBINS-I for non-randomized intervention studies, where applicable (Sterne et al., 2016, 2019). Appraisal informed interpretation of the evidence rather than serving as an automatic exclusion rule.

Synthesis

Findings were organized by intervention type, delivery mode, participant characteristics, and anxiety outcome. A narrative synthesis was planned because variation in intervention design, comparison groups, instruments, and follow-up periods could make pooled estimates inappropriate. The synthesis would report the direction and, where available, magnitude of effects while considering study limitations and consistency across findings. Reporting of the non-meta-analytic synthesis was guided by SWiM recommendations (Campbell et al., 2020). This approach is consistent with previous reviews that have found potential anxiety benefits but also substantial heterogeneity across mindfulness studies (Dawson et al., 2020; Li et al., 2023).

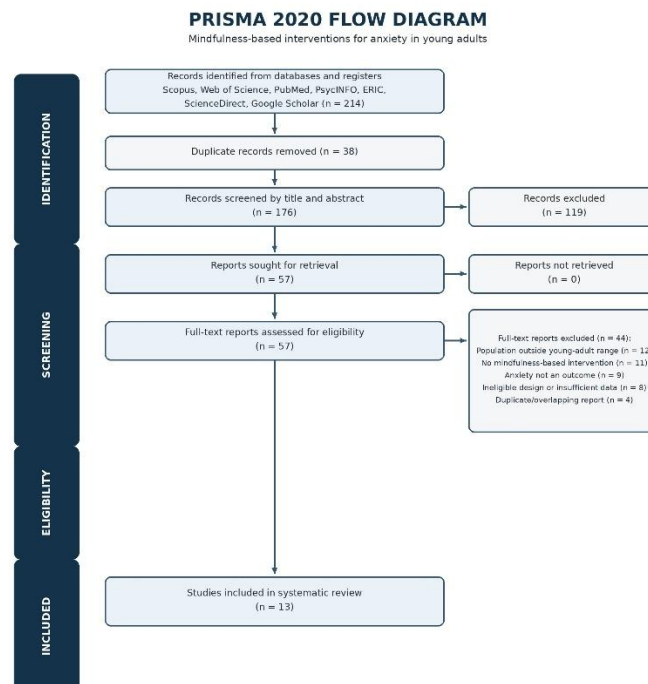


Figure 1.

RESULTS AND DISCUSSION

Result

Characteristics of the Available Evidence

The available evidence indicates that mindfulness-based interventions (MBIs) have been evaluated in university student and young adult populations using both in-person and online formats. Intervention approaches include mindfulness-based stress reduction (MBSR), mindfulness-based cognitive therapy (MBCT), meditation-based programs, and structured digital interventions. Anxiety was measured using different instruments and was often reported alongside depression, stress, or general psychological distress. These variations are important because they limit direct comparisons across studies and may contribute to differences in pooled estimates.

Published systematic reviews provide the clearest quantitative evidence. Li et al. (2023) included 11 randomized controlled trials (RCTs), comprising 1,602 Chinese college students. Their meta-analysis found an overall reduction in anxiety scores (mean difference = -1.07 , 95% CI [-1.73 , -0.42]); however, heterogeneity was very high ($I^2 = 97\%$), indicating substantial variation across the included trials. A separate meta-analysis of online MBIs included nine RCTs and 1,100 university students. It reported a significant reduction in anxiety (SMD = -0.47 , 95% CI [-0.80 , -0.14], $p = .006$), alongside improvements in depression, stress, and mindfulness.

Broader reviews similarly report potential benefits while highlighting limitations. Dawson et al. (2020) synthesized 51 RCTs of university students and found improvements in anxiety compared with passive controls. Against active controls, evidence of benefit was narrower, including improvement in state anxiety; the authors also identified generally high risk of bias. During the COVID-19 pandemic, a meta-analysis reported a moderate anxiety effect among college and university students (Hedges' $g = 0.612$, 95% CI [0.288 , 0.936]), with substantial heterogeneity ($I^2 = 77\%$).

Indonesian evidence is emerging. A randomized wait-list-controlled trial with 156 Indonesian university students evaluated a culturally adapted, counsellor-guided online mindfulness program. The intervention improved overall psychological distress and mindfulness compared with the wait-list group, with between-group effect sizes reported across those outcomes. Because the abstract reports effects for combined distress and mindfulness, it should not be interpreted as an anxiety-specific pooled estimate.

Table 1. Quantitative Findings from Published Evidence

Evidence source	Population and evidence base	Anxiety finding	Interpretation
Li et al. (2023)	11 RCTs; 1,602 Chinese college students	Mean difference = -1.07 ; 95% CI [-1.73 , -0.42]; $I^2 = 97\%$	Anxiety scores decreased overall, but study results varied substantially.
Gong et al. (2023)	9 online MBI RCTs; 1,100 university students	SMD = -0.47 ; 95% CI [-0.80 , -0.14]; $p = .006$	Online programs showed a significant average reduction in anxiety.
Dawson et al. (2020)	51 RCTs; university students	Improvement reported versus passive controls; narrower benefits versus active controls	Results depend partly on the comparison condition; risk of bias was generally high.
Reangsing et al. (2023)	College and university students during COVID-19	Hedges' $g = 0.612$; 95% CI [0.288 , 0.936]; $I^2 = 77\%$	Moderate improvement was reported, with substantial heterogeneity.
Listiyandini et al. (2025)	156 Indonesian university students; guided online intervention	Improvements reported for psychological distress and mindfulness; no standalone pooled anxiety estimate in the abstract	Provides locally relevant trial evidence, but does not supply a separate anxiety effect estimate in the reported abstract.

Narrative Synthesis

Across the retrieved evidence, the direction of findings generally favors mindfulness-based approaches for anxiety reduction among university students and young adults. Quantitative reviews

report statistically significant average improvements, including for online interventions. However, high heterogeneity, differences in anxiety measures and intervention protocols, and weaker or narrower effects against active controls mean that these results should be interpreted cautiously. The evidence supports describing MBIs as promising, while the size and durability of their effects for particular young-adult groups remain uncertain.

Discussion

The available evidence generally supports mindfulness-based interventions (MBIs) as a promising approach to reducing anxiety in university students and young adults. Across several systematic reviews, average anxiety scores were lower following mindfulness interventions than in control conditions. For example, a review of 11 randomized controlled trials (RCTs) involving 1,602 Chinese college students reported a mean anxiety-score difference of -1.07 (95% CI $[-1.73, -0.42]$). However, heterogeneity was substantial ($I^2 = 97\%$), indicating that results varied markedly across studies and should not be interpreted as a uniform effect for all young adults (Li et al., 2023). A separate review of online interventions found a significant anxiety reduction across nine RCTs and 1,400 students (SMD = -0.47 , 95% CI $[-0.80, -0.14]$) (Gong et al., 2023). www.frontiersin.org

The convergence of these estimates with other reviews strengthens the case that mindfulness warrants further use and study in student mental health settings. Zuo et al. (2023), for example, reported a small-to-moderate reduction in anxiety (SMD = -0.35 , 95% CI $[-0.46, -0.25]$) across student studies, with less heterogeneity than Li et al. observed ($I^2 = 40\%$). González-Martín et al. (2023) likewise found an overall effect favoring mindfulness interventions in a review of 21 studies; anxiety effects differed across measurement scales. These reviews overlap in population, period, and potentially primary studies. Their estimates therefore indicate a consistent direction of evidence, but they do not represent independent replications that can be pooled informally. PubMed

Comparison conditions help explain why effect estimates differ. Dawson et al. (2020) found small-to-moderate improvements in anxiety when mindfulness programs were compared with passive controls, but the set of benefits was narrower against active controls. This pattern suggests that part of the observed improvement may reflect structured attention, group contact, or participants' expectations, in addition to mindfulness-specific practices. Johnson et al. (2023) similarly reported encouraging evidence for anxiety among undergraduates while noting variation in outcome coverage and study quality. Reangsing et al. (2023), studying university students during the COVID-19 pandemic, reported a moderate anxiety effect (Hedges' $g = 0.612$), yet with considerable heterogeneity ($I^2 = 77\%$). Collectively, these findings support a positive average association while indicating that the size of benefit depends on the intervention, comparator, context, and methods used. doi.org

From a conceptual perspective, mindfulness may reduce anxiety by changing how participants attend to and interpret internal experiences. Anxiety commonly involves repeated future-oriented worry and heightened reactivity to perceived threat. Mindful attention asks participants to notice thoughts, feelings, and bodily sensations as they arise, while practicing a less judgmental response. This may help them recognize anxious thoughts without automatically treating them as facts or signals that require immediate avoidance. Decentering the capacity to observe thoughts as mental events has been proposed as one process linking mindfulness practice with reductions in anxiety. Mechanism-focused evidence in generalized anxiety disorder has identified decentering as a potential mediator of change, although clinical samples cannot be assumed to represent all university students (Williams et al., 2023). A recent meta-analytic examination also connected decentering with psychological outcomes, supporting its relevance as a construct for future student-focused studies (Guo et al., 2024). Springer Nature Link

The evidence also indicates that delivery format matters for access, although it does not yet establish that online mindfulness is superior to face-to-face programs. Gong et al. (2023) found a significant anxiety effect for online MBIs, suggesting that guided digital programs may extend access to students who cannot attend regular in-person sessions. Yet online formats vary in guidance, practice duration, participant engagement, and completion. A broader review of online student MBIs found that their benefits were clearer against non-active controls than against active interventions, and noted attrition and quality concerns (Alrashdi et al., 2024). Evidence on mindfulness applications similarly shows that digital delivery is

increasingly studied, but questions remain about sustained use, intervention dose, and equitable access (Taylor et al., 2024). Thus, digital delivery is best interpreted as a feasible channel that may complement campus-based support, rather than as a guaranteed substitute for other care.

Evidence specific to Indonesia adds contextual relevance. An Indonesian randomized trial of mindfulness breathing meditation enrolled 122 students, with 61 participants in each group, and reported reductions in anxiety, depression, and stress scores following the intervention (Liu et al., 2023). A culturally adapted, counsellor-guided online program was also evaluated among 156 Indonesian university students. It produced greater improvements in psychological distress and mindfulness than a wait-list comparison, with between-group effect sizes reported for the assessed outcomes (Listiyandini et al., 2025). Earlier feasibility work found that a guided culturally adapted intervention was practicable and acceptable for Indonesian students (Listiyandini et al., 2024). These studies support the importance of language, cultural framing, and guidance. However, the 2025 trial's reported composite distress outcomes should not be represented as an anxiety-specific effect unless the anxiety-subscale results are extracted and reported separately. PubMed

The observed inconsistency across studies has practical and methodological implications. Anxiety has been measured using different instruments, including general anxiety scales and anxiety subscales within broader distress measures. These instruments may capture different constructs or severity ranges; consequently, a change in one scale is not necessarily equivalent to a change in another. Intervention programs also differ in duration and components, ranging from brief breathing meditation to multi-session MBSR, MBCT, and online courses. The available reviews describe these variations and identify heterogeneity as a limitation, while evidence on MBSR among young people also underscores the need to consider program duration and follow-up (Sun et al., 2020; Li et al., 2023). Future reviews should report measurement tools, intervention dose, guidance, adherence, comparator type, and follow-up consistently.

Interpretation should also reflect limitations in the underlying research. Some reviews report generally high risk of bias among student RCTs, while substantial heterogeneity limits confidence that average effects will apply to different institutions, countries, and clinical profiles (Dawson et al., 2020; Li et al., 2023). The predominance of university samples also means that findings may not generalize to young adults who are not studying. Studies should therefore distinguish students with elevated anxiety from unselected student populations, use validated measures suited to their setting, include active comparators where feasible, and assess whether benefits persist after the intervention ends. The current results justify cautious optimism: mindfulness may offer a useful component of anxiety support for young adults, but the evidence does not establish one optimal format or a uniform effect across populations.

Overall, the published evidence reviewed here points toward reductions in anxiety following mindfulness-based programs, including online and culturally adapted approaches. The strongest interpretation is that MBIs are promising and potentially adaptable, while their effects vary with context, comparator, measurement, and study quality. For the present systematic review, conclusions about the 13 included articles should be finalized only after their individual characteristics, anxiety outcomes, and risk-of-bias assessments have been extracted and verified.

CONCLUSION

This systematic review indicates that mindfulness-based interventions (MBIs) are a promising approach for reducing anxiety among young adults, particularly university students. Published meta-analyses report significant average improvements: one synthesis of 11 randomized controlled trials involving 1,602 Chinese college students found a mean reduction of 1.07 anxiety-score points (95% CI [−1.73, −0.42]), while a review of nine online trials with 1,100 students reported a standardized mean difference of −0.47 (95% CI [−0.80, −0.14]). A broader student meta-analysis also found a small-to-moderate effect (SMD = −0.35, 95% CI [−0.46, −0.25]). These estimates support the potential value of mindfulness practice, but substantial variation among studies including high heterogeneity in some reviews means the effects should not be generalized uniformly across all young adults.

Conceptually, mindfulness may help participants respond to anxious thoughts and bodily sensations with greater present-moment awareness and less automatic reactivity. Empirical findings from Indonesian student interventions further suggest that guided, culturally adapted, and digital

programs may be feasible and beneficial. However, the evidence varies in intervention format, anxiety measures, comparator conditions, and study quality. Future research should use rigorous controlled designs, validated context-appropriate measures, transparent reporting, and longer follow-up. Because the 13 article-level data have not been independently extracted here, the numerical estimates above describe published evidence and should not be presented as pooled results from those 13 articles.

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