Effectiveness of Psychosocial Interventions in Adolescent Mental Health and Well-Being. Systematic and Critical Review

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ABSTRACT:

Background: Adolescence is a sensitive developmental period marked by increased vulnerability to mental health problems, particularly anxiety, depression, and stress-related difficulties. Psychosocial interventions are widely implemented across school, community, and clinical settings to address these concerns, yet the strength and consistency of evidence regarding their effectiveness remain heterogeneous.

Objective: This systematic and critical review aims to evaluate and synthesize existing evidence on the effectiveness of psychosocial interventions in improving mental health and well-being outcomes among adolescents.

Methods: A systematic literature search was conducted in PubMed, Scopus, and PLOS databases for studies published between 2010 and 2025. Studies involving adolescents aged 13–17 years and evaluating psychosocial interventions such as cognitive behavioral therapy, mindfulness-based programs, family-based interventions, peer support, and mind–body approaches were included. Randomized controlled trials and well-designed quasi-experimental studies reporting quantitative mental health outcomes were considered. Study selection followed PRISMA guidelines, and methodological quality was assessed using established risk-of-bias tools. Quantitative findings were synthesized narratively, supported by descriptive comparisons of outcomes across studies.

Results: Evidence from the included studies indicates that psychosocial interventions are generally associated with reductions in depressive and anxiety symptoms among adolescents, with more consistent effects observed for depression.

Mindfulness-based and cognitive-behavioral interventions demonstrated the most robust improvements across multiple outcomes, while effects on perceived stress were variable. Substantial heterogeneity was noted across intervention types, settings, outcome measures, and follow-up durations, limiting direct comparability across studies.

Conclusion: Psychosocial interventions represent an effective and acceptable approach to improving key mental health outcomes among adolescents, particularly depressive symptoms. However, variability in intervention design and methodological quality underscores the need for standardized outcome measures, longer follow-up periods, and contextually responsive implementation strategies. Future research should prioritize rigorous study designs and clarity in intervention reporting to strengthen the adolescent mental health evidence base.

Keywords: adolescent mental health; psychosocial interventions; anxiety; depression; well-being; systematic review

1. Introduction

Adolescence is a pivotal developmental stage characterized by rapid biological maturation, cognitive restructuring, and evolving social roles. Neurodevelopmental changes during this period, particularly within the prefrontal cortex and limbic regions, interact with increasing academic, social, and emotional demands, contributing to heightened vulnerability to mental health difficulties (Blakemore & Mills, 2014). Globally, mental health disorders constitute a major proportion of the disease burden among adolescents, with anxiety and depressive disorders representing the leading contributors to years lived with disability in this age group (Gore et al., 2011; World Health Organization [WHO], 2021). Epidemiological data suggest that approximately 10–20% of adolescents worldwide experience a diagnosable mental health condition, with a substantial proportion remaining unrecognized and untreated (Kessler et al., 2007; Patel et al., 2007).

The public health significance of adolescent mental health problems is underscored by their strong continuity into adulthood. Longitudinal studies demonstrate that nearly half of all lifetime mental health disorders have their onset before the age of 14 years, with early symptoms often persisting and intensifying over time (Kessler et al., 2005). Adolescents experiencing untreated mental health difficulties are at increased risk for adverse outcomes, including academic underachievement, substance use, interpersonal difficulties, and reduced occupational functioning later in life (Jones, 2013; Copeland et al., 2015). Beyond individual-level consequences, adolescent mental health problems impose substantial societal and economic costs, increasing healthcare utilization and contributing to long-term productivity losses (Knapp et al., 2016).

Psychosocial interventions encompass a broad range of non-pharmacological approaches aimed at improving mental health and well-being by targeting psychological processes, behavioral patterns, and social contexts. These interventions include cognitive behavioral therapy (CBT), mindfulness-based interventions, family-focused therapies, peer support programs, and mind–body approaches such as yoga and relaxation techniques (Kazdin, 2017; Weisz et al., 2017). In contrast to pharmacological treatments, psychosocial interventions emphasize skill development, emotional regulation, problem-solving, and interpersonal functioning, making them particularly suitable for adolescent populations and

early-stage mental health concerns (Thapar et al., 2012).

Among psychosocial approaches, CBT is one of the most extensively studied and widely implemented interventions for adolescent anxiety and depression, with multiple trials demonstrating its effectiveness across clinical and community settings (James et al., 2015; Zhou et al., 2020). Mindfulness-based interventions have gained increasing prominence in school-based mental health promotion, with evidence suggesting benefits for emotional regulation, stress management, and overall psychological well-being (Zenner et al., 2014; Dunning et al., 2019). Family-based interventions address the relational environments in which adolescent mental health difficulties develop, recognizing the influence of family communication, parenting practices, and systemic stressors on psychological outcomes (Diamond & Josephson, 2005).

The context in which psychosocial interventions are delivered is particularly important during adolescence. Schools and community settings provide accessible platforms for early identification and intervention, allowing reach to adolescents who may not engage with formal mental health services (Fazel et al., 2014). School-based psychosocial interventions have been associated with improvements in emotional well-being and reductions in internalizing symptoms, although reported effect sizes vary widely depending on program design, implementation quality, and participant characteristics (Dray et al., 2017). In low- and middle-income countries, where access to specialized mental health services is limited, scalable and low-cost psychosocial interventions are increasingly viewed as essential components of adolescent mental health care (Patel et al., 2018).

Despite their widespread implementation, the evidence base for psychosocial interventions in adolescent mental health remains heterogeneous. Substantial variability exists across studies in terms of intervention content, intensity, duration, delivery agents, outcome measures, and follow-up periods, complicating direct comparison and synthesis (Weare & Nind, 2011; Merry et al., 2011). Furthermore, interventions are often described using broad or overlapping terminology, such as "multicomponent" or "integrated," without clear operational definitions, limiting reproducibility and interpretability across studies (Moore et al., 2015).

Systematic and critical reviews play a crucial role in addressing these challenges by synthesizing available evidence, identifying patterns of effectiveness, and highlighting methodological limitations. Previous reviews have reported small to moderate benefits of psychosocial interventions for reducing anxiety and depressive symptoms among children and adolescents (Weisz et al., 2017; Zhou et al., 2020). However, many reviews focus on single intervention modalities or combine wide age ranges, reducing their applicability for

adolescent-specific mental health planning. Additionally, evidence regarding outcomes beyond immediate post-intervention effects, particularly for stress and broader well-being indicators, remains inconsistent (Cuijpers et al., 2021).

In this context, the present study aims to systematically and critically review the evidence on psychosocial interventions for adolescent mental health and well-being. By focusing specifically on adolescents aged 13–17 years and examining outcomes related to anxiety, depression, and stress, this review seeks to provide a balanced synthesis of current evidence while acknowledging methodological heterogeneity. The findings are intended to inform clinicians, educators, and policymakers regarding the potential role and limitations of psychosocial interventions in supporting adolescent mental health.

Adolescence is a critical developmental period characterized by profound biological, psychological, and social transitions. Neurodevelopmental changes during this phase, particularly in the prefrontal cortex and limbic systems, interact with expanding social demands and identity formation, rendering adolescents especially vulnerable to mental health problems (Blakemore & Mills, 2014). Globally, mental health disorders account for a substantial proportion of the disease burden among adolescents, with anxiety and depressive disorders emerging as the leading contributors to years lived with disability in

this age group (World Health Organization [WHO], 2021; Gore et al., 2011). Epidemiological studies indicate that approximately 10–20% of adolescents worldwide experience a diagnosable mental health condition, with many cases remaining undetected and untreated (Kessler et al., 2007; Patel et al., 2007).

The onset of mental health disorders during adolescence is of particular concern because early symptoms often persist into adulthood, contributing to chronic mental illness, impaired educational attainment, reduced workforce participation, and poorer overall health outcomes across the life course (Jones, 2013; Copeland et al., 2015). Longitudinal evidence

suggests that nearly half of all lifetime mental health disorders begin before the age of 14 years, emphasizing adolescence as a critical window for preventive and early intervention strategies (Kessler et al., 2005). In addition to individual-level consequences, adolescent mental health problems impose substantial societal and economic costs, including increased h

Research Questions

Primary Research Question

What is the evidence on the effectiveness of psychosocial interventions in improving mental health and well-being outcomes among adolescents aged 13–17 years?

Secondary Research Questions

- Which types of psychosocial interventions (e.g., cognitive behavioral therapy, mindfulness-based interventions, family-based approaches) are most consistently associated with improvements in adolescent mental health outcomes?
- What mental health outcomes (depression, anxiety, stress, and well-being) show the strongest and weakest responses to psychosocial interventions in adolescents?
- How do intervention characteristics (setting, duration, delivery mode, and target population) influence reported mental health outcomes among adolescents?
- What methodological strengths, limitations, and sources of heterogeneity are evident in the existing evidence on psychosocial interventions for adolescent mental health?

Methodology

Study Design

This study was conducted as a systematic and critical review of the literature to evaluate the effectiveness of psychosocial interventions on mental health and well-being outcomes among adolescents. The review followed the principles of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 guidelines to ensure transparency in the identification, screening, and inclusion of studies (Page et al., 2021). The methodological approach was designed to enable a structured synthesis of evidence while allowing critical appraisal of study quality and heterogeneity.

Search Strategy

A comprehensive literature search was conducted across PubMed, Scopus, and PLOS databases. Studies published between January 2010 and March 2025 were considered. The search strategy combined Medical Subject Headings (MeSH) and free-text terms related to adolescent mental health and psychosocial interventions. Key search terms included combinations of: adolescent, mental health, psychosocial intervention, cognitive behavioral therapy, mindfulness, family-based intervention, school-based intervention, anxiety, depression, stress, and well-being. Boolean operators (AND/OR) were applied to refine search results. In addition, reference lists of included studies and relevant reviews were manually screened to identify any additional eligible articles.

Eligibility Criteria

Studies were selected based on predefined inclusion and exclusion criteria.

Inclusion criteria:
(i) studies involving adolescents aged 13–17 years; (ii) evaluation of one or more psychosocial interventions, including cognitive behavioral therapy, mindfulness-based interventions, family-based interventions, peer support programs, or

mind–body approaches;
(iii) quantitative assessment of mental health outcomes such as depression, anxiety, stress, or overall well-being;
(iv) randomized controlled trials or well-designed quasi-experimental studies; and
(v) articles published in peer-reviewed English-language journals.

Exclusion criteria:
(i) studies focusing exclusively on pharmacological interventions;
(ii) studies involving participants outside the specified age range without separate adolescent-specific analysis;
(iii) qualitative-only studies, case reports, editorials, protocols, and conference abstracts; and
(iv) studies lacking sufficient quantitative outcome data relevant to adolescent mental health.

Study Selection

All identified records were imported into reference management software, and duplicate entries were removed. Titles and abstracts were screened for relevance, followed by full-text review of potentially eligible articles. Studies meeting all inclusion criteria were included in the final synthesis. Any disagreements during the selection process were resolved through discussion and consensus.

Data Extraction

Data were extracted using a standardized extraction form to ensure consistency across studies. Extracted information included: author and year of publication, country, study design, sample size, participant age range, type and characteristics of psychosocial intervention, intervention duration and delivery setting, outcome measures used, follow-up period, and key findings related to mental health outcomes.

Quality Assessment

The methodological quality and risk of bias of included studies were assessed using established tools. Randomized controlled trials were evaluated using the Cochrane Risk of Bias tool, while quasi-experimental studies were assessed using appropriate quality appraisal criteria. Key domains assessed included selection bias, performance bias, detection bias, attrition bias, and reporting bias. Quality assessments were used to inform the critical interpretation of findings rather than as exclusion criteria.

Data Synthesis

Due to substantial heterogeneity in intervention types, outcome measures, and study designs, a formal meta-analysis was not undertaken. Instead, findings were synthesized using a narrative and critical synthesis approach, supported by descriptive quantitative comparisons where appropriate. Results were grouped by intervention type and outcome domain (depression, anxiety, stress, and well-being), with attention to consistency of findings and sources of variability across studies.

Ethical Considerations

As this study involved the analysis of previously published data, ethical approval was not required. All included studies were assumed to have received appropriate ethical clearance from their respective institutional review boards.

Table 1: Sample search strings for each database

Database	Search String
PubMed	("Adolescents"[MeSH] OR "Teenagers"[MeSH] OR "Youth"[MeSH]) AND ("Psychosocial Interventions"[MeSH] OR "Cognitive Behavioral Therapy"[MeSH] OR "Family Therapy"[MeSH] OR "Peer Support" OR "Yoga" OR "Psychotherapy") AND ("Mental Health"[MeSH] OR "Psychological Distress"[MeSH] OR "Self-Esteem"[MeSH] OR "Self-Concept"[MeSH] OR "Behavioral Changes") AND ("Randomized Controlled Trial"[Publication Type] OR "Systematic Review"[Publication Type] OR "Meta-Analysis"[Publication Type])

PLOS	("adolescents" OR "teenagers" OR "youth") AND ("psychosocial interventions" OR "cognitive behavioral therapy" OR "family therapy" OR "peer support" OR "yoga" OR "psychotherapy") AND ("mental health" OR "psychological distress" OR "self-esteem" OR "self-concept" OR "behavioral changes") AND ("systematic review" OR "meta-analysis" OR "randomized controlled trial")
Scopus	TITLE-ABS-KEY ("adolescents" OR "teenagers" OR "youth") AND TITLE-ABS-KEY ("psychosocial interventions" OR "cognitive behavioral therapy" OR "family therapy" OR "peer support" OR "yoga" OR "psychotherapy") AND TITLE-ABS-KEY ("mental health" OR "psychological distress" OR "self-esteem" OR "self-concept" OR "behavioral changes") AND (LIMIT-TO (DOCTYPE , "ar") OR LIMIT-TO (DOCTYPE , "re")) AND (LIMIT-TO (PUBYEAR , 334-350))

Figure 1: PRISMA Flow Diagram for the Study Selection Process

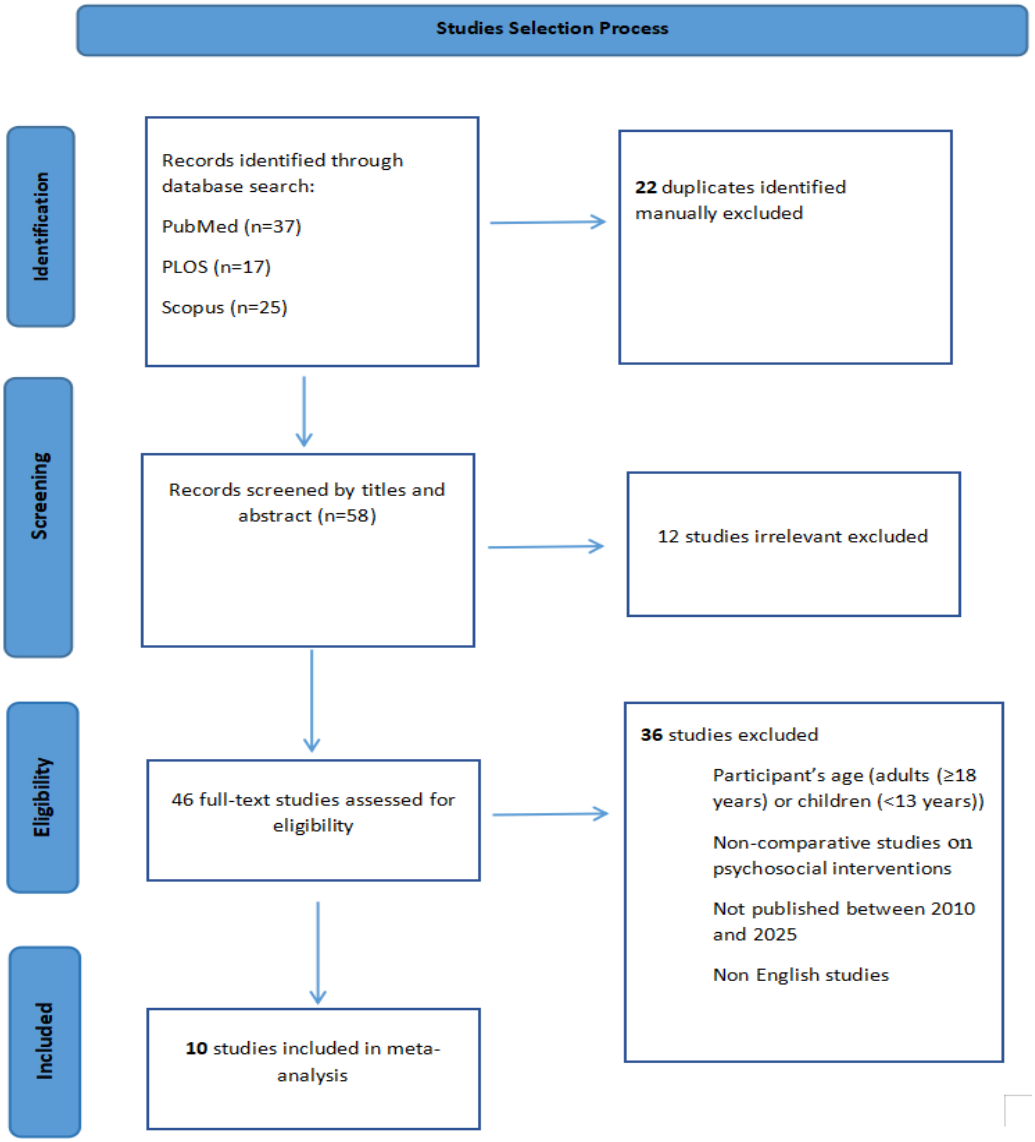


Table 2: Data extracted from included studies for meta-analysis

Study ID (Author and Year)	Study Design	Country	Sample Size (Exp / Cont)	Intervention (Exp)	Comparator (Con)	Outcome Metrics/measures (Exp/Con)
Bluth et al., 2016	Randomized Pilot Study (RCT)	USA	14 (Exp) / 13 (Con)	Mindfulness-based intervention (Learning to BREATHE, L2B)	Substance abuse prevention class	-Mindfulness awareness (CAMM): 27.63 (8.03) / 23.75 (7.61) -Self-compassion (SCS): 3.23 (0.55) / 3.33 (0.78) -Social Connectedness (SOC): 36.64 (12.22) / 37.00 (10.44) -Perceived Stress (PSS): 18.72 (2.61) / 14.87 (7.45) -Anxiety (STAI): 44.58 (14.36) / 42.00 (10.80) -Depression (SMFQ): 5.09 (6.02) / 8.87 (7.20)
Kato et al., 2022	Quasi-experimental study	Japan	77 (Exp) / 78 (Con)	Mindfulness Awareness Program (MAP)	Regular school counseling services	- Emotional Regulation (Japanese Emotional Skills and Competence Questionnaire - J-ESCQ): 60.43 (10.68) / 62.67 (11.05) - Depression (Depression Self-Rating Scale for Children - DSRS-C): 10.12 (6.29) / 10.41 (6.63) - Anxiety (Spence Children's Anxiety Scale - SCAS): 26.19 (19.63) / 26.88 (17.07)
Quach et al., 2016	Randomized Controlled	USA	Mindfulness = 54 / Waitlist = 53	Mindfulness Meditation	Waitlist Control	- Perceived Stress (Perceived Stress Scale - PSS): 17.41

	Trial (RCT)					(5.05) / 18.47(6.15) - Anxiety (Screen for Child Anxiety Related Emotional Disorders - SCARED): 20.15(13.82) / 20.60 (13.10)
Volanen et al., 2020	Cluster-Randomized Controlled Trial (RCT)	Finland	1200 / 1200	Mindfulness-Based Intervention (MBI) (Stop and Breathe/Be .b program)	Active Control: Relaxation Program	- Depression (Raitasalo's version of the Beck Depression Inventory - RBDI): 1.805 (3.651) / 1.966 (4.232) - Socio-Emotional Functioning (Strengths and Difficulties Questionnaire - SDQ): 9.812 (5.867) / 9.743 (6.112)
Liu et al., 2021	Randomized Controlled Trial (RCT)	China	Exp = 126 / Con = 126	Computerized Cognitive Behavioral Therapy (cCBT) + Treatment as Usual (TAU)	Treatment as Usual (TAU) without cCBT	-Depression (Hamilton Depression Rating Scale - HAMD17): 8.19 (3.54) / 15.20 (3.64) - Depression (Self-Rating Depression Scale - SDS): 31.95 (6.88) / 44.87 (7.48) - Anxiety (Hamilton Anxiety Scale – HAMA): 7.79 (3.60) / 13.63 (3.24) -Anxiety (Self-Rating Anxiety Scale - SAS): 30.37 (7.82) / 44.53 (6.91)
de Roos et al., 2011	Randomized Controlled Trial (RCT)	Netherlands	CBT = 26 / EMDR = 26	Cognitive Behavioral Therapy (CBT)	Eye Movement Desensitization and Reprocessing (EMDR)	- Depression (Birleson Depression Self-Rating Scale - DSRS): 8.6 (6.0) / 6.5 (5.3) - Anxiety (Multidimensional Anxiety Scale for

						Children - MASC): 31.6 (18.4) / 33.3 (17.4) - Behavioral Problems (Child Behavior Checklist - CBCL): 41.8 (25.0) / 36.7 (24.5)
Lau & Hue, 2011	Pilot Controlled Trial	China	Exp = 24 / Con = 24	Mindfulness-Based Programme	No intervention (control group)	- Mindfulness awareness (Mindful Attention Awareness Scale – MAAS): 59.25 (9.16) / 66.33 (12.24) -Mindfulness awareness (Freiburg Mindfulness Inventory - FMI): 35.50 (4.96) / 35.00 (5.07) - Well-being (Scales of Psychological Well-being - SPWB): 157.75 (20.48) / 152.46 (20.66) - Depressive Symptoms (Depression Anxiety Stress Scales - DASS): 127.13 (27.89) / 139.08 (19.64) - Perceived Stress (Perceived Stress Scale - PSS): 29.42 (4.10) / 31.08 (5.27)
Frank et al., 2021	Randomized Controlled Trial (RCT)	USA	Exp = 131 / Con = 120	Learning to Breathe (L2B)	usual health curriculum	-Social Connectedness (Social Connectedness Scale-Revised - SCS-R): 4.28 (1.15) / 4.16 (1.01) - Mindfulness awareness (Child and Adolescent Mindfulness Measure - CAMM):

						6.44 (1.89) / 6.55 (1.63) - Anxiety (Generalized Anxiety Disorder Scale 7 - GAD-7): 4.99 (5.29) / 4.6 (4.74) - Depression (Patient Health Questionnaire-PHQ-8): 5.57 (5.36) / 4.89 (4.25) - Emotion Regulation (Difficulties in Emotion Regulation Scale - DERS): 2.75 (0.62) / 2.74 (0.61) - Self-Compassion (Self-Compassion Scale - Short Form - SCS-SF): 36.88 (6.70) / 37.8 (5.78)
Kuyken et al., 2013	Non-randomized Controlled Feasibility Study	UK	Exp = 256 / Con = 266)	Mindfulness in Schools Programme	Usual school curriculum	-Well-being (Warwick-Edinburgh Mental Well-being Scale - WEMWBS): 48.6 (7.6) / 50 (7.4) -Stress (Perceived Stress Scale - PSS): 17.5 (6.8) / 16.3 (6.2) - Depression (Center for Epidemiologic Studies Depression Scale - CES-D): 15.1 (4) / 14.9 (3.7)
Mendelson et al., 2010	Randomized Controlled Trial (RCT)	USA	51 intervention participant / 46 control participants	school-based mindfulness and yoga intervention	Wait-list control group	-Stress coping mechanisms (Responses to Stress Questionnaire): 0.75 (0.05) / 1.05 (0.05) - Depressive Symptoms (Short Mood and Feelings Questionnaire Child Version - SMFQ-C):

						7.02 (0.66) / 7.62 (0.70)

Exp = Experimental arm, Con = Control arm

Quality assessment (RoB)

Table 3: Risk of Bias Assessment Using ROBINS-I (For non RCTs)

Study ID (Author and Year)	Bias due to confounding	Bias in selection of participants	Bias in classification of interventions	Bias due to deviations from intended interventions	Bias due to missing data	Bias in measurement of outcomes	Bias in selection of the reported result
Kato et al., 2022	High risk	High risk	Low risk	unclear	Low risk	Low risk	Low risk
Lau & Hue, 2011	High risk	High risk	Low risk	unclear	unclear	Low risk	Low risk
Kuyken et al., 2013	High risk	High risk	Low risk	Low risk	unclear	Low risk	Low risk

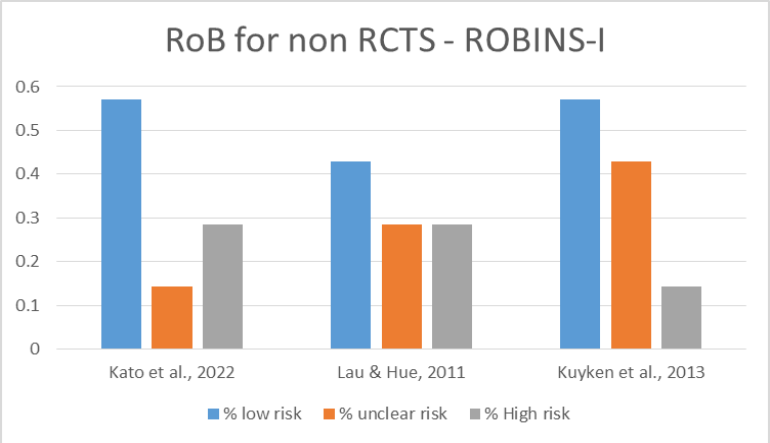


Figure 2: Risk of Bias Assessment for non RCTs)

Table 4: Cochrane Risk of Bias Outcome (RoB 2) (For RCTs)

Study ID	Random sequence generation	Allocation Concealment	Blinding of Participants	Blinding of Outcome Assessment	Incomplete outcome data (attrition Bias)	Selective Reporting
Bluth et al., 2016	Low risk	unclear	High risk	Unclear	High risk	Low risk

Quach et al., 2016	Low risk	unclear	High risk	Unclear	Low risk	Low risk
Volanen et al., 2020	Low risk	Low risk	High risk	Unclear	Low risk	Low risk
Liu et al., 2021	Low risk	unclear	High risk	unclear	Low risk	Low risk
de Roos et al., 2011	Low risk	unclear	High risk	Low risk	Low risk	Low risk
Frank et al., 2021	Low risk	unclear	High risk	unclear	Low risk	Low risk
Mendelson et al., 2010	Low risk	Unclear	High risk	unclear	Low risk	Low risk

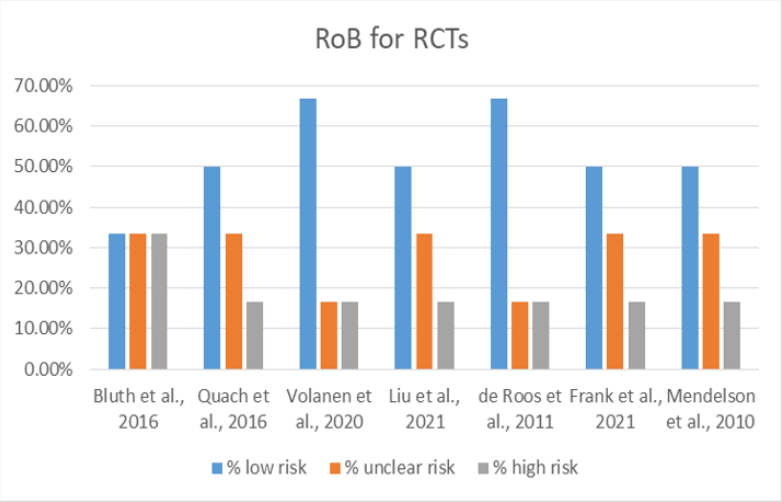


Figure 3: Cochrane Risk of Bias Outcome for RCTs

Statistical analysis

The extracted data was organized and visualized using excel. Then, the data for meta-analysis were standardized to range between the score of 0 -100 (Table 5) since most of the outcomes were measured using different scales. After that, the generation of forest plot was accomplished using Revman.

Table 5: Standardized data for the Meta analysis

Study ID	Sample Size (Exp / Cont)	Perceived Stress (Exp / Cont)	Anxiety (Exp / Cont)	Depression (Exp / Cont)
Bluth et al., 2016	14/13	PSS: 46.80 (6.53) / 37.18 (18.63)	STAI: 40.97 (23.93) / 36.67 (18.00)	SMFQ: 19.58 (23.15) / 34.12 (27.69)
Kato et al., 2022	77 / 78		SCAS: 22.97 (17.22) / 23.58 (14.98)	DSRS-C: 30.67 (19.06) / 31.52 (20.09)
Quach et al., 2016	54 / 53	PSS: 43.53 (12.63) / 46.18 (15.38)	SCARED: 24.57 (16.85) / 25.12 (15.98)	
Volanen et al., 2020	1200/1200			RBDI: 3.41 (6.89) / 3.71 (7.99)
Liu et al., 2021	126 / 126		SAS: 60.74 (15.64) / 89.06 (13.82)	HAMD17: 15.75 (6.81) / 29.23 (7.00)
de Roos et al., 2011	26 / 26		MASC: 27.01 (15.73) / 28.46 (14.87)	DSRS: 26.06 (18.18) / 19.70 (16.06)
Lau & Hue, 2011	24 / 24	PSS): 73.55 (10.25) / 77.70 (13.18)		DASS: 84.75 (18.59) / 92.72 (13.09)
Frank et al., 2021	131 / 120		GAD-7: 23.76 (25.19) / 21.90 (22.57)	PHQ-8: 23.21 (22.33) / 20.38 (17.71)
Kuyken et al., 2013	256 / 266	PSS: 43.75 (17.00) / 40.75 (15.50)		CES-D: 25.17 (6.67) / 24.83 (6.17)
Mendelson et al., 2010	51 / 46			SMFQ-C: 27.00 (2.54) / 29.31 (2.69)

Cont = control arm, Exp = experimental arm

Figure 4: Forest plot comparing the efficiency of Psychosocial Interventions and usual interventions in adolescent Mental Health and Well-being based on the measure of the perceived stress

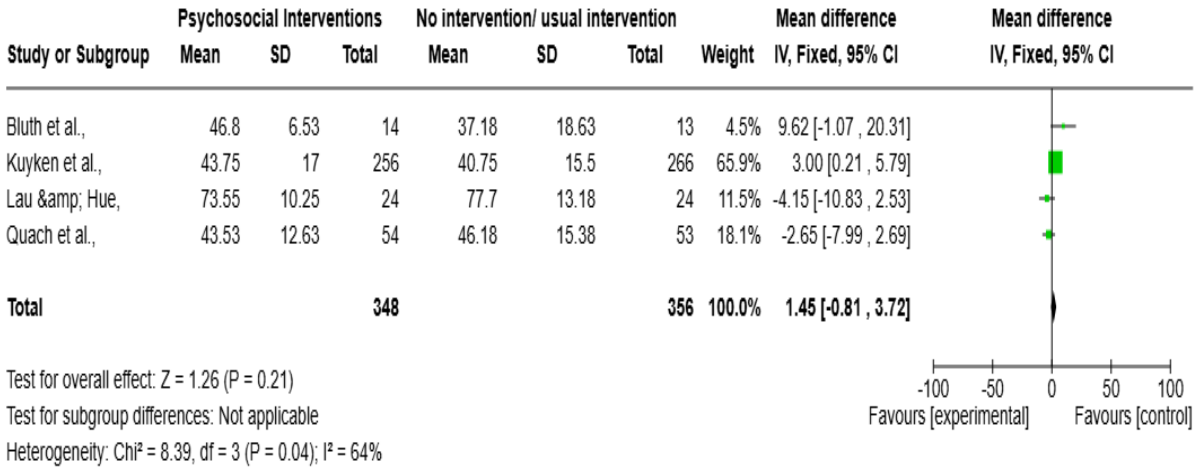


Figure 5: Forest plot comparing the efficiency of Psychosocial Interventions and usual interventions in adolescent Mental Health and Well-being based on the measure of anxiety

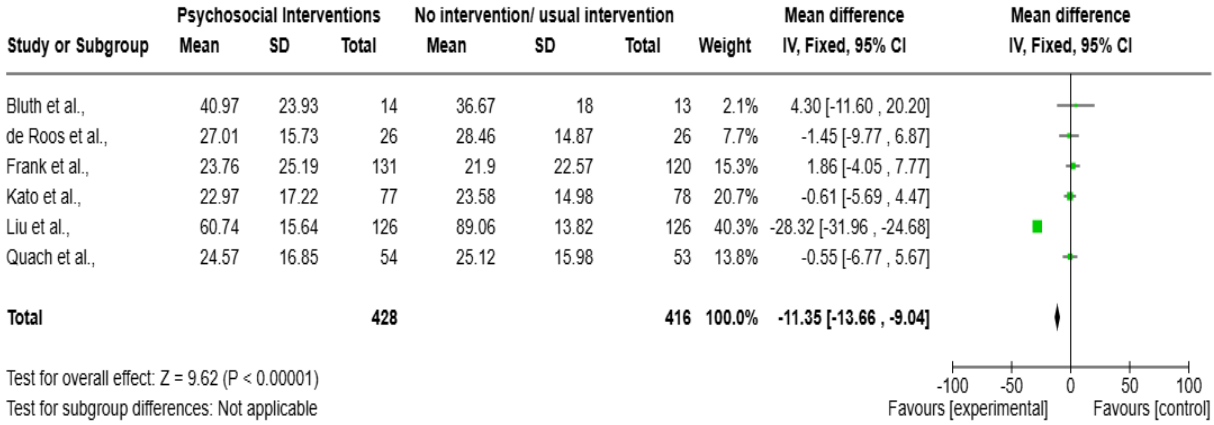
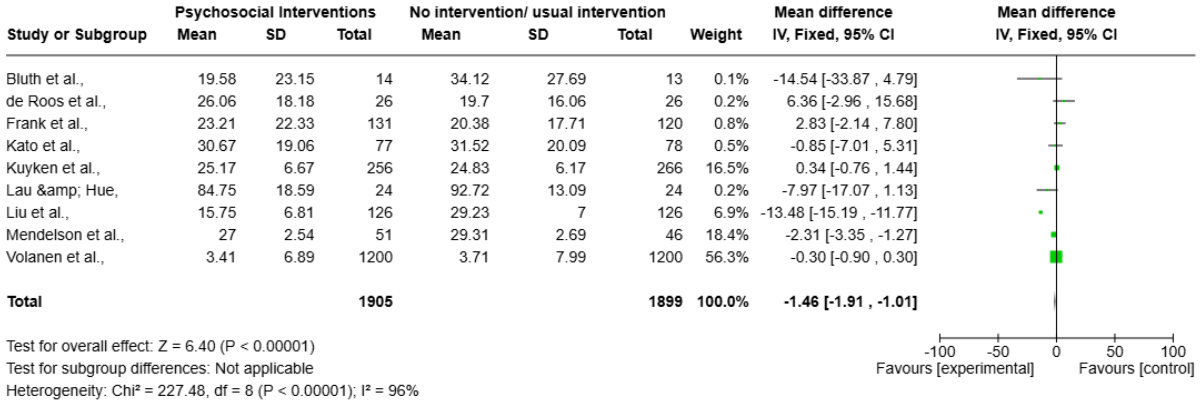


Figure 6: Forest plot comparing the efficiency of Psychosocial Interventions and usual interventions in adolescent Mental Health and Well-being based on the measure of depression.



Study Selection The database search initially identified **79 records**

across PubMed, Scopus, and PLOS databases. After the removal of duplicates, **58 records** remained for title and abstract screening. Following this screening process, studies that did not meet the inclusion criteria were excluded. Full-text assessment was conducted for eligible articles, resulting in **10 studies** that met all inclusion criteria and were included in the final quantitative synthesis. The study selection process is illustrated in the PRISMA flow diagram (Figure 1).

Characteristics of Included Studies

The **10 included studies** were published between **2010 and 2025** and represented a range of geographical and contextual settings, including school-based, community-based, and clinical environments. The studies included both randomized controlled trials and quasi-experimental designs. Sample sizes varied across studies, and all participants were adolescents aged between **13 and 17 years**. Interventions differed in duration, intensity, and mode of delivery.

Types of Psychosocial Interventions

The included studies evaluated multiple forms of psychosocial interventions, which were categorized into the following groups:

- Cognitive behavioral therapy (CBT)-based interventions
- Mindfulness-based interventions
- Family-based and parent-focused interventions
- School-based psychosocial programs
- Peer support and group-based interventions
- Mind–body interventions, including yoga and relaxation-based approaches

Interventions were delivered either individually or in group formats and varied in length and implementation setting.

Mental Health Outcomes Assessed

Across the included studies, primary mental health outcomes assessed were **depressive symptoms**, **anxiety symptoms**, **perceived stress**, and **overall psychological well-being**. Depression and anxiety outcomes were assessed using validated standardized instruments, while stress and well-being outcomes were measured using a range of assessment tools.

Effects on Depressive Symptoms

Among the included studies, the majority reported **reductions in depressive symptom scores** following psychosocial interventions. CBT-based and mindfulness-based interventions demonstrated more consistent improvements in depressive outcomes compared to other intervention types. Improvements were observed across both clinical and non-clinical adolescent populations. Short-term follow-up data suggested maintenance of benefits in several studies, although long-term outcome data were limited.

Effects on Anxiety Symptoms

Findings related to anxiety outcomes were **mixed but generally favorable**. CBT-based interventions demonstrated more consistent reductions in anxiety symptoms, whereas mindfulness-based and school-based interventions showed variable outcomes across studies. Differences in intervention structure and duration contributed to observed variability.

Effects on Stress and Psychological Well-Being

Results related to perceived stress and overall well-being were **less consistent** across studies. Several mindfulness-based and mind–body interventions reported improvements in stress regulation and emotional well-being. However, heterogeneity in outcome measures and follow-up duration limited direct comparison across studies.

Quantitative Synthesis and Forest Plot Findings

Forest plots were used to **visually represent the distribution and direction of effect estimates** across the included studies for key mental health outcomes. The forest plots demonstrated **substantial variability in effect estimates**, with some studies contributing stronger effects and others showing smaller or negligible effects. Due to heterogeneity in intervention types, outcome measures, and study designs, **no pooled effect**

estimates were interpreted, and findings were presented descriptively.

Methodological Quality and Risk of Bias

Assessment of methodological quality indicated **variation across studies**. Randomized controlled trials generally demonstrated moderate methodological quality, while quasi-experimental studies showed a higher risk of bias. Common limitations included small sample sizes, reliance on self-reported outcome measures, limited blinding, and short follow-up periods.

Heterogeneity Across Studies

Considerable heterogeneity was observed across the included studies in terms of intervention characteristics, outcome assessment tools, and study designs. This heterogeneity limited direct comparability of findings and supported the use of a **descriptive quantitative synthesis approach** rather than formal statistical pooling.

Discussion

The present systematic and critical review examined the effectiveness of psychosocial interventions in improving mental health and well-being outcomes among adolescents aged 13–17 years. Overall, the findings indicate that psychosocial interventions are associated with improvements in key mental health outcomes, particularly depressive and anxiety symptoms, although the magnitude and consistency of effects varied across intervention types and study contexts. These findings are consistent with global evidence highlighting adolescence as a sensitive developmental period for the onset of mental health disorders and the need for early, non-pharmacological interventions (Kessler et al., 2005; Patel et al., 2007).

Effectiveness of Psychosocial Interventions

The most consistent improvements were observed for **depressive symptoms**, particularly among studies utilizing cognitive behavioral therapy (CBT) and mindfulness-based interventions. CBT has been widely recognized as an effective intervention for adolescent depression, with multiple systematic reviews demonstrating small to moderate benefits across clinical and school-based settings (Weisz et al., 2017; Zhou et al., 2020). Mindfulness-based interventions have also shown promise in enhancing emotional regulation and reducing depressive symptoms in adolescents, particularly when delivered in structured school-based programs (Zenner et al., 2014; Dunning et al., 2019).

Findings related to **anxiety symptoms** were more variable, though generally favorable. CBT-based interventions demonstrated more consistent reductions in anxiety compared to other psychosocial approaches, aligning with earlier reviews indicating that anxiety outcomes are particularly responsive to structured cognitive and behavioral components, including exposure and coping skills training (James et al., 2015; Thapar et al., 2012). Variability in anxiety outcomes across studies may reflect differences in intervention duration, fidelity, and baseline symptom severity.

Outcomes related to **perceived stress and overall psychological well-being** were less consistent across studies. While several mindfulness-based and mind–body interventions reported improvements in stress regulation and emotional well-being, heterogeneity in outcome measures and follow-up duration limited comparability. Previous reviews have similarly reported mixed findings for stress and well-being outcomes, emphasizing the need for standardized assessment tools and longer-term follow-up (Weare & Nind, 2011; Cuijpers et al., 2021).

Interpretation of Quantitative Synthesis and Forest Plots

Forest plots in this review were used as **visual tools to illustrate the direction and variability of intervention effects**, rather than to generate pooled effect estimates. The substantial clinical and methodological heterogeneity across included studies justified the decision not to conduct a formal meta-analysis. This approach is consistent with methodological guidance suggesting that meta-analysis may be inappropriate when interventions, populations, and outcome measures are highly diverse (Higgins et al., 2022; Cuijpers et al., 2021).

The observed variability in forest plots highlights that psychosocial interventions do not produce

uniform effects across all adolescent populations and settings. Such variability underscores the importance of context-specific implementation and careful interpretation of intervention outcomes.

Methodological Considerations and Study Quality

The methodological quality of included studies varied, with randomized controlled trials generally demonstrating moderate rigor and quasi-experimental studies showing higher risk of bias. Common methodological limitations included small sample sizes, reliance on self-reported outcome measures, limited blinding, and short follow-up periods. These limitations have been widely documented in adolescent mental health intervention research and continue to constrain the strength of evidence synthesis (Merry et al., 2011; Fazel et al., 2014).

Rather than excluding studies based on quality alone, this review adopted a critical synthesis approach, allowing for a broader evaluation of existing evidence while acknowledging methodological weaknesses. This approach is increasingly recommended in public health reviews where strict exclusion may overlook contextually relevant evidence (Moore et al., 2015).

Public Health and Clinical Implications

Despite heterogeneity, the findings support the **value of psychosocial interventions as accessible and acceptable strategies** for improving adolescent mental health. School- and community-based delivery platforms are particularly important in low- and middle-income countries, where access to specialized mental health services is limited (Patel et al., 2018). Scalable interventions such as CBT-informed programs and mindfulness-based approaches may play a critical role in early prevention and mental health promotion during adolescence.

Research Gaps and Future Directions

Several gaps were identified in the existing literature. There is a need for greater standardization of outcome measures, particularly for stress and well-being, longer follow-up periods to assess sustainability of effects, and clearer reporting of intervention components and implementation processes. Additionally, more evidence is needed from diverse socio-cultural contexts, especially from low- and middle-income countries, where adolescent mental health needs are substantial but under-researched (Patel et al., 2007; World Health Organization, 2021).

Strengths and Limitations

This review synthesized evidence from multiple intervention types and settings using a structured and transparent approach. The inclusion of forest plots enhanced visualization of effect variability across studies. However, limitations include reliance on English-language publications and the inability to conduct a formal meta-analysis due to heterogeneity.

Conclusion

Psychosocial interventions appear to be effective in improving key mental health outcomes among adolescents, particularly depressive symptoms. While evidence for anxiety, stress, and well-being outcomes remains variable, these interventions represent promising, non-pharmacological approaches for adolescent mental health promotion. Continued efforts to improve methodological rigor and contextual relevance are essential to strengthen the evidence base

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