Mental Health and Positive Development Prevention Interventions: Overview of Systematic Reviews

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CONTEXT: Previous reviews of mental health interventions have focused on adolescents (10–19 years), with a paucity of comprehensive evidence syntheses on preventive interventions for school-aged children (5–10 years).

OBJECTIVE: To summarize and synthesize the available evidence from systematic reviews of mental health and positive development interventions for children aged 5–14.9 years in both high-income (HIC) and low- and middle-income countries (LMIC), with a focus on preventive and promotive strategies.

DATA SOURCES: This overview includes all relevant reviews from OVID Medline, The Cochrane Library, and Campbell Systematic Reviews through December 2020.

STUDY SELECTION: We included systematic reviews that synthesized empirical studies using experimental or quasi-experimental designs to evaluate the effectiveness of interventions in children aged 5–14.9 years.

DATA EXTRACTION: Data extraction and quality assessment were completed independently and in duplicate by two review authors. The AMSTAR2 tool was used to assess methodological quality.

RESULTS: We included 162 reviews. The greatest evidence was found in support of school-based universal and anti-bullying interventions in predominantly HIC. Moderate evidence was found for the use of substance abuse prevention, and early learning and positive development interventions in mixed settings. In LMIC-only contexts, the most promising evidence was found for positive youth development programs.

LIMITATIONS: The review was primarily limited by paucity of high-quality research due to methodological issues and high heterogeneity.

CONCLUSIONS: This overview of reviews highlights the need for further research to consolidate findings and understand the specific criteria involved in creating positive mental health and development outcomes from the various interventions considered.

abstract

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SUPPLEMENT ARTICLE

The Sustainable Development Goals have brought attention to early childhood development and the intergenerational benefits of investing in early life.[1] Since early childhood development underpins several of the Sustainable Development Goals, increased focus on this area is imperative to reach these global goals by 2030.[1] It is estimated that 10% to 20% of children and adolescents worldwide experience mental health disorders, of which ~50% manifest before age 14.[1] In Europe and the Americas, mental health disorders are among the leading causes of disability-adjusted life-years among children aged 5 to 14 years.[2] The burden of poor mental health and development prevents children from achieving their full potential, and has downstream impacts on the human capital of entire countries.

Most mental health conditions are underdiagnosed and undertreated, and children and adolescents face barriers to recovery, including stigma, shame, and inaccessibility of interventions.[3] Intervening at an early age is critical because the consequences of mental illness extend into adulthood, leading to mental and physical harm across the life course.[3] Additionally, multidirectional linkages exist between mental health conditions and other developmental concerns, such as risk-taking behaviors, poor education, and additional health problems.[4] For example, depression and anxiety are leading causes of illness and disability among adolescents worldwide, with the potential to lead to self-harm, substance abuse, and risk-taking behaviors.[3,5] Among adolescents aged 15 to 19, about 6% of all deaths are attributed to suicide and self-harm.[5] Inadequate mental health support within schools and families highlights the need for more preventive and promotive

efforts that are delivered earlier in life, and which improve children's resilience, emotional regulation, and ability to avoid risky behaviors. More than ever before, the dramatic rise in mental health issues among school-aged children and adolescents (SACA) in the wake of the global coronavirus disease 2019 pandemic has increased awareness of this issue as it manifolds, with interest in mitigation strategies.[6]

Why It Is Important to Do This Review

Previous reviews of mental health interventions in childhood have been focused on adolescents (10–19 years),[7,8] and there is a dearth of comprehensive evidence syntheses specifically focused on school-aged children aged 5 to 10 years, and on preventive and promotive interventions that start in childhood and continue into adolescence. It is important to consider the needs of the school-age children age group in intervention efforts for several reasons. It is recognized that preventive interventions are more effective when implemented before the age of disease onset.[9] Because of the early age of onset for many mental health conditions, these preventive interventions could be more effective at preventing mental health conditions in adolescents and young adults if they were implemented during the school-aged years.[3] Despite this, programs designed, for example, to prevent substance use initiation are often delivered to children who are aged >12 years.[10] Younger children, particularly those aged <8 years, may be better suited to receive nonsmoking messages because their perception of smoking is still largely negative.[10] Likewise, primary school children (grades 1–5) may be better suited to receive antibullying interventions because the incidence of perpetration and victimization is highest in these

children.[11] Additionally, it is important to consider a life course perspective when designing mental health and positive development interventions because those implemented before adolescence can impact both adolescence and adulthood.[7] Furthermore, in the current landscape of school closures and lockdowns, evidence continues to build on the impact of coronavirus disease 2019 on mental health in young children.[12–14] For example, early evidence from China illustrates a prevalence of anxiety and depressive symptoms of 19% and 23%, respectively, in primary school children after home confinement.[15] For these reasons, this review will focus on interventions delivered to children aged <10 years, with the recognition that their delivery may often extend into early adolescence (10–14.9 years).

METHODS

Objectives

This review aims to summarize and synthesize the available evidence from systematic reviews of mental health and positive development interventions for children aged 5 to 14.9 in both high-income countries (HIC) and low- and middle-income countries (LMIC), with a focus on preventive and promotive strategies.

Eligibility Criteria

We considered systematic reviews published until December 2020 that synthesized empirical studies using either experimental or quasi-experimental designs to evaluate the effectiveness of interventions.

For this overview, we primarily focused on those reviews that covered ages 5 to 14.9 years, which encompasses the period of "school-age" and includes late childhood and early adolescence. Although the primary focus is on ages 5 to 14.9

years, we still included reviews in which most of the sample's target age range falls within our selected age limit. For example, we included reviews where the target age range of the intervention was 5 to 19 years or where the stated average age of participants fell between 5 and 14.9 years. In reviews that reported large age ranges (eg, 5–19 years), we were unable to parse out effects of younger age groups unless the data were disaggregated by age bands. In reviews that reported disaggregated data by age, we have prioritized children aged 5 to 9 years. We chose to include both HIC and LMIC because we did not expect to find evidence for all interventions in the LMIC context alone. However, when possible, we highlight LMIC evidence in this article where it existed. The reviews that focused on interventions delivered to special populations of children that were amenable to prevention (eg, those with chronic illness such as epilepsy) or nongeneralizable contexts (eg, conflict and humanitarian settings) were considered separately and are listed in Supplemental Information. This narrowing of scope was performed to allow for generalizability of effective interventions to the greatest number of children possible.

We focused on universal, generalizable, preventive interventions that aim to promote positive development, prevent mental disorders, improve mental health and well-being, or modify its determinants. We focused exclusively on preventive interventions because intervening before the onset of mental health problems is particularly beneficial in the context of young children who could potentially be spared of psychological distress later in adolescence or adulthood.

Several delivery strategies were considered, including school-based, community-based, digital, and mixed settings. An expanded listing of intervention types and associated delivery strategies can be found in Supplemental Information. Interventions that can be categorized into 1 or more of the following domains described below are the focus of this article. The domains were selected through expert discussion, the scope of previous overviews, and with focus on the greatest disease burden. Although some reviews could be categorized into multiple domains, we took a pragmatic approach to organizing them in the different sections of the narrative synthesis to ensure reviews of similar intervention types were considered together. Universal prevention interventions were placed in this category if the authors described the intervention as universal or covered a broad range of outcomes. The remaining interventions were categorized into each domain if either the intervention or outcome was specific to that domain. See Fig 1 for a general overview of the interventions, delivery strategies, and outcomes assessed.

- Which universal prevention interventions are effective in improving multiple domains of SACA mental health status, development, and well-being?
- Which interventions are effective in targeting the following key issues in SACA:
  o bullying prevention interventions;
  o substance use prevention interventions; and
  o self-harm prevention interventions?
- Which interventions are effective in supporting the following aspects of nurturing care in SACA:
  o supporting safety and security, and preventing abuse and maltreatment;
  o promoting responsive caregiving and parenting practices; and
  o providing learning opportunities and promoting positive child development?
- Which targeted interventions are effective for special populations of SACA that are amenable to prevention or nongeneralizable contexts?

Information Sources and Search Strategy

Keyword searches were conducted in the following electronic databases: OVID Medline, The Cochrane Library, and Campbell Systematic Reviews. Each domain of interest described above used its own search strategy to identify relevant systematic reviews of interventions (see Supplemental Information). We also hand-searched the reference lists of key overviews to identify additional relevant systematic reviews. Although initial searches were conducted in 2019, an updated search was conducted until December 2020 to identify newer reviews.

Screening and Selection

At both title/abstract and full-text screening stages, a team of reviewers independently screened all records retrieved by the searches for relevance based on predefined eligibility criteria (see Supplemental Information). Any disagreements were resolved through discussion or by a third reviewer when necessary.

Data Items, Collection, and Quality Assessment

A standardized data extraction form was used to extract data from included reviews. The extraction form (see Supplemental Information) included general
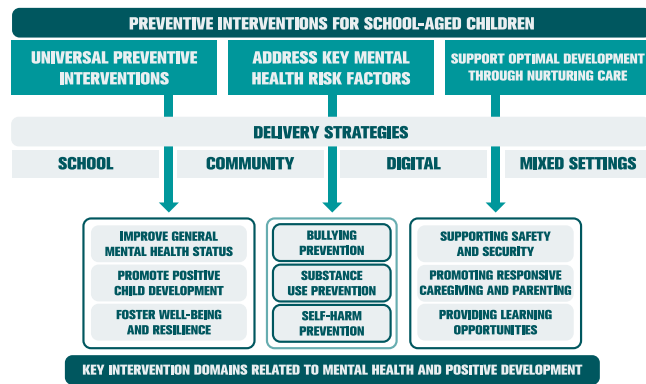
FIGURE 1
Conceptual framework of mental health and positive development interventions, delivery strategies, and outcomes assessed in this overview.

review characteristics, description of the target population, intervention types, delivery strategies, and data on outcomes and intervention effectiveness. The AMSTAR2 tool was used to assess the methodological quality of the included systematic reviews.[16] Full-text data extraction and quality assessment for all included reviews was conducted independently by 2 reviewers. Pooled estimates (eg, risk ratios, odds ratios, and mean differences) from meta-analyses were extracted for a variety of mental health and positive development outcomes.

RESULTS

Study Selection

After removal of duplicates, 1926 reviews were title/abstract-screened for inclusion on the basis of the eligibility criteria previously described. Two-hundred twenty-nine citations were screened at full text and 162 studies were ultimately included (Fig 2). Sixty-seven studies did not meet our inclusion criteria and are presented in the Table of Excluded Studies (see Supplemental
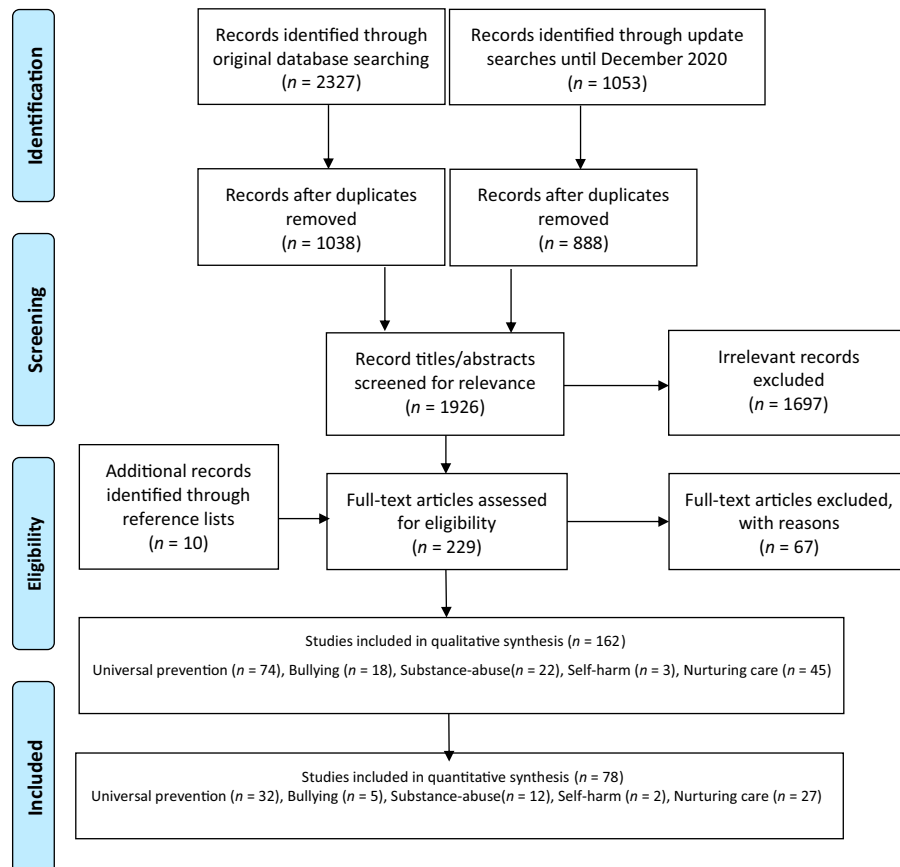

FIGURE 2
PRISMA review flow diagram.

Information). The 162 reviews selected for final analysis were composed of 5 domains: nurturing care (n = 45),[17–62] self-harm (n = 3),[63–65] bullying (n = 18),[11,66–82] substance use (n = 22),[83–104] and universal prevention interventions (n = 74).[105–176]

Study Characteristics of Included Reviews

Twenty-nine reviews covered targeted interventions and were synthesized separately in Supplemental Information H. Four reviews included both universal and targeted populations.[63,93,107,108] Study characteristics for the 137 included reviews are summarized in Table 1 and additional detail is provided in Supplemental Information.

Methodological Quality (AMSTAR2) of Included Reviews

AMSTAR2 assessments were performed for 78 reviews that reported meta-analyses.[17,21–31, 33–35,37,39,40,45,46,48,50,51,56,58,59,61,63,64, 67–69,76,81,84,85,88–90,94,95,97,98, 100–102,110,112,114,118–120,123,125,129,138, 141,143,145,148–150,154,155,157–160,162, 165–167,169,172–175,177] Thirty-one studies (39.7%) were graded as "critically low," 21 studies (26.9%) were graded as "low," 6 studies (7.8%) were graded as "moderate," and 20 studies (25.6%) were graded as "high" quality. Additional detail of assessments can be found in Supplemental Information.

Summary of the Effects of Interventions

Effects of interventions with quality ratings from all included reviews that were able to meta-analyze data on any mental health and/or positive development outcome have been summarized in Tables 2–6, by domain and delivery strategy.

The key effects of interventions on depression, anxiety, and externalizing symptoms/behavior

have been summarized in Table 7, by delivery strategy.

Universal Prevention Interventions

Sixty-one reviews synthesized data or narratively reported on universal prevention interventions. Overall, we found evidence to support the effectiveness of psychosocial and exercise interventions to prevent negative mental health outcomes[118,120,125,129,150,154, 155,159] and multicomponent positive psychology (PP), social–emotional learning (SEL), mindfulness, and mentoring-based interventions to promote well-being[119,145,157,158] in school-aged children.

School-Based Interventions

Thirty reviews synthesized data on a range of school-based interventions. The greatest effects on mental health were found for psychosocial, internal resilience, SEL, and multicomponent, PP-based interventions. For example, resilience-focused interventions for children aged 5 to 18 years were effective relative to control for reducing depressive symptoms (standardized mean difference [SMD] = −0.08, 95% confidence interval [CI]: −0.14 to −0.01), internalizing (SMD = −0.21, 95% CI: −0.36 to −0.06) and externalizing problems (SMD = −0.18, 95% CI: −0.34 to −0.01), and general psychological distress (SMD = −0.11, 95% CI: −0.21 to −0.01).[118] Similarly, psychosocial interventions that were delivered by teachers to school-aged children were effective in reducing internalizing outcomes (d = 0.133, 95% CI: 0.002 to 0.263).[125]

Community-Based Interventions

Six reviews synthesized data on community-based interventions; however, the diversity of intervention components and outcomes assessed prevented the ability to synthesize results and

make any definitive statements about effectiveness. In all cases, the findings were encouraging but required more research to make firm conclusions.[118,131,137,140,145,147] Of note, cognitive behavioral therapy (CBT) was found to be an encouraging intervention at the parental/family context to prevent adolescent depression.[118] Childhood pet ownership had a wide range of emotional health benefits, in particular for self-esteem and loneliness.[144]

Mixed-Setting Interventions

Twenty reviews synthesized data on a broad range of interventions delivered in mixed settings. The greatest effects on mental health were found for exercise, CBT, mentoring, single-session therapy, and mindfulness-based interventions. For example, exercise-based interventions for school-aged children were effective in improving self-esteem (SMD = 0.51, 95% CI: 0.15 to 0.88),[121] reducing externalizing problems (d = 0.320, 95% CI: 0.023 to 0.616), internalizing problems (d = 0.316, 95% CI: 0.073 to 0.558), improving self-concept (d = 0.297, 95% CI: 0.127 to 0.468), and academic achievement (d = 0.367, 95% CI: 0.038 to 0.697).[156] CBT interventions reduced anxiety for children aged 3 to 8 years (SMD = −1.34, 95% CI: −1.59 to −1.09)[160] and self-rated depression in children aged 8 to 24 years (SMD −0.11, 95% CI: −0.17 to −0.05).[130]

Digital-Based Interventions

Five studies synthesized data on digital-based interventions, and all found encouraging results for the effectiveness of these interventions to achieve positive mental health outcomes. For example, results from online prevention interventions indicated a significant positive effect of computerized CBT on adolescents' anxiety and depressive

TABLE 1 Study Characteristics Summary Table

Domain	Number of Reviews, Excluding Special Populations	Number of Special Population Reviews	Number of LMIC-Only Reviews	Number of LMIC + HIC Reviews	Number of HIC-Only Reviews	Age Range	Publication Date Range	Number of RCT-Only Reviews
Universal prevention	61	15	5	18	19	<1 to 25 y	2002 to 2020	20
Bullying	14	4	1	5	6	0 to 19 y	2007 to 2021	3
Substance abuse	22	1	1	11	9	5 to 26 y	2008 to 2020	10
Self-harm	2	2	0	0	1	0 to 18 y	2019	0
Nurturing care	38	7	1	15	18	6 mo to 21 y	2006 to 2021	10
Totals	137	29	8	49	53	0 to 26 y	2002 to 2021	43

symptoms.[115] Furthermore, universal psychosocial interventions delivered digitally were effective in improving mental health, in particular, interpersonal skills, emotional regulation, and alcohol and drug education, for children aged 10 to 19 years (effect size [ES] = 0.197, 95% CI: 0.016 to 0.379).[154]

Bullying Prevention

Fourteen reviews synthesized data or narratively reported on bullying prevention interventions. Overall, evidence supports school-based interventions and whole-school approaches.[11,67–70, 73,76–78]

School-Based Interventions

Fourteen reviews examined school-based interventions. Evidence suggests that antibullying interventions are effective for a range of bullying-related outcomes. For example, interventions significantly reduced bullying (ES = −0.150; 95% CI: −0.191 to −0.109) and improved mental health (ES = −0.205; 95% CI: −0.277 to −0.133) at study endpoint.[67] However, more research is needed to determine whether anti-cyberbullying interventions delivered in schools reduce cyberbullying behaviors.[68,71,73] Reviews disagreed on which age group benefited most. Several reviews reported that bullying and victimization steadily increase with age, suggesting that intervening in elementary schools

through preventive interventions may significantly reduce bullying-related outcomes.[11,78]

Digital Interventions

One review also examined information and communication technology-mediated interventions delivered in schools, finding that more research is required.[74]

Substance Use Prevention

Twenty-two reviews synthesized data or narratively reported on substance use prevention interventions. Most evidence supported the use of family- and school-based interventions to prevent substance use initiation in school-aged children.

Community-Based Interventions

Eight reviews examined community-based interventions and concluded that more research is needed. However, promising evidence was found for Youth Participatory Action Research to increase community awareness and multicomponent interventions to prevent smoking.[85,104] Four reviews found that family-based interventions were effective for preventing substance abuse initiation.[83,91,93,102] For example, interventions prevented smoking initiation (relative risk [RR] = 0.76; 95% CI: 0.68 to 0.84).[102] One review concluded that family-based interventions were more effective when delivered in early adolescence.[93]

School-Based Interventions

Five reviews examined school-based interventions. Combining social competence and influence components had small but consistent positive effects on drug use prevention (odds ratio [OR] = 0.50; 95% CI: 0.28 to 0.87).[90,101] Health education and social learning components in combination with oral, written, and audiovisual support material improved attitudes toward drugs (d = 0.44; 95% CI: 0.33 to 0.54).[88] Skills-based components improved self-efficacy compared with affective components, but had the same effect as knowledge-based components on drug knowledge. Affective components improved decision-making and drug knowledge compared with knowledge-based components.[89]

Digital-Based Interventions

Three reviews found little, though promising, evidence to support digital-based interventions. One review reported reduced cannabis use (OR = 0.33; 95% CI: 0.13 to 0.54) persisting to 12 months.[84]

Mixed-Setting Interventions

Three reviews examined mixed settings. Community- and school-based mentoring prevented substance use.[100] Compared with other delivery strategies; universal school-based interventions that targeted multiple risk behaviors prevented substance use.[97]

TABLE 2 Universal Prevention Meta-Analysis Results

Source	Comparison	Outcomes	Pooled Effect Estimates (95% CI)	AMSTAR Rating	Total # of People	Total # of Studies
School-based interventions						
Langford et al[138] (2015)	Antibullying interventions (Friendly Schools and KiVa programs) versus no intervention	Being bullied	OR = 0.83 (0.72 to 0.96)	Critically low	26 256	6
	Antibullying interventions versus no intervention	Bullying others	OR = 0.9 (0.78 to 1.04)		26 176	6
	Tobacco interventions versus no intervention	Tobacco use; tobacco only	OR = 0.77 (0.64 to 0.93)		4747	3
	Multiple risk behaviors interventions versus no intervention	Tobacco use; multiple risk behavior	OR = 0.84 (0.76 to 0.93)		9992	5
	Alcohol interventions versus no intervention	Alcohol use; alcohol only	OR = 0.72 (0.34 to 1.52)		7481	2
	Multiple risk behaviors interventions vs no intervention	Alcohol use; multiple risk behavior	OR = 0.75 (0.55 to 1.02)		8140	4
	Multiple risk behaviors interventions vs no intervention	Substance use; multiple risk behavior	OR = 0.57 (0.29 to 1.14)		6820	3
	Alcohol interventions vs no intervention	Substance use; alcohol only	OR = 0.94 (0.78 to 1.12)		7481	2
Dray et al[118] (2017)	Usual care	Depressive symptoms	SMD = −0.08 (−0.14 to −0.01)	Low	30	—
		Anxiety symptoms	SMD = −0.14 (−0.28 to 0.00)		22	—
		Hyperactivity	SMD = −0.07 (−0.18 to 0.05)		5	—
		Conduct problems	SMD = 0.01 (−0.11 to 0.12)		4	—
		Internalizing problems	SMD = −0.21 (−0.36 to −0.06)		4	—
		Externalizing problems	SMD = −0.18 (−0.34 to −0.01)		4	—
		General psychological distress	SMD = −0.11 (−0.21 to −0.01)		6	—
Franklin et al[125] (2017)	Usual care	Internalizing	G = 0.133 (0.002 to 0.263)	Critically low	—	27
		Externalizing	G = 0.015 (−0.037 to 0.066)		—	96
		Internalizing versus externalizing	G = 0.118 (0.034 to 0.202)		—	123
Taylor et al[157] (2017)	Usual care	Social and emotional assets: SEL skills	ES = 0.23 (0.15 to 0.31)	Critically low	—	29
		Social and emotional assets: attitudes	ES = 0.13 (0.05 to 0.21)		—	26
		Positive and negative indicators of well-being: positive social behavior	ES = 0.13 (0.05 to 0.21)		—	28
		Positive and negative indicators of well-being: academic performance	ES = 0.33 (0.17 to 0.49)		—	8
			ES = 0.14 (0.07 to 0.21)		—	34

TABLE 2 Continued

Source	Comparison	Outcomes	Pooled Effect Estimates (95% CI)	AMSTAR Rating	Total # of People	Total # of Studies
		Positive and negative indicators of well-being: conduct problems	ES = 0.16 (0.08 to 0.23)		—	35
		Positive and negative indicators of well-being: emotional distress	ES = 0.16 (0.09 to 0.24)		—	28
van Genugten et al[160] (2017)	Usual care	Internalizing	ES = 0.20 (0.03 to 0.38)	Low	—	13
		Short-term internalizing	ES = 0.09 (−0.01 to 0.20)		—	6
		Long-term self-esteem	ES = 0.29 (0.18 to 0.41)		—	14
		Short-term self-esteem	ES = 0.16 (0.05 to 0.26)		—	5
Watson et al[162] (2017)	Usual care	Physical activity on classroom behavior	SMD = 0.60 (0.20 to 1.00)	Critically low	804	4
		Physical activity on cognitive function	SMD = 0.33 (−0.11 to 0.77)		1081	5
Sanchez et al[149] (2018)	School-based mental health programs versus no services, peer tutoring or psychologist program	All outcomes	ES = 0.39 (0.29 to 0.49)	Low	—	43
		Externalizing problems	ES = 0.50 (0.35 to 0.63)		—	27
		Internalizing problems	ES = 0.30 (0.16 to 0.43)		—	18
		Attention problems	ES = 0.10 (0.03 to 0.17)		—	7
		Substance use	ES = 0.18 (−0.15 to 0.50)		—	7
Tejada-Gallardo et al[158] (2020)	Active control groups (n = 5) and nonactive/waitlist (n = 4)	Subjective well-being (studies postintervention)	ES = 0.24 (0.11 to 0.37)	High	—	6
		Psychological well-being (studies postintervention)	ES = 0.25 (−0.01 to 0.51)		—	5
		Depression (studies postintervention)	ES = 0.28 (0.13 to 0.43)		—	4
		Anxiety (studies postintervention)	ES = 0.14 (0.04 to 0.24)		—	4
		Subjective well-being (studies postintervention excluding low quality studies)	ES = 0.21 (0.05 to 0.37)		—	4
		Psychological well-being (studies postintervention excluding low quality studies)	ES = 0.31 (−0.03 to 0.67)		—	4
		Depression (studies postintervention excluding low quality studies)	ES = 0.34 (0.24 to 0.44)		—	3
		Anxiety (studies postintervention excluding low quality studies)	ES = 0.15 (0.05 to 0.25)		—	3

TABLE 2 Continued

Source	Comparison	Outcomes	Pooled Effect Estimates (95% CI)	AMSTAR Rating	Total # of People	Total # of Studies
		Subjective well-being (follow-up studies)	ES = 0.13 (0.03 to 0.23)		—	4
		Psychological well-being (follow-up studies)	ES = 0.44 (−0.45 to 1.31)		—	3
		Depression (follow-up studies)	ES = 0.31 (0.20 to 0.41)		—	3
		Anxiety (follow-up studies)	ES = 0.15 (0.05 to 0.26)		—	3
		Psychological well-being (follow-up studies excluding low quality studies)	ES = 0.66 (−0.39 to 1.72)		—	2
		Depression (follow-up studies excluding low quality studies)	ES = 0.29 (0.11 to 0.47)		—	2
		Anxiety (follow-up studies excluding low quality studies)	ES = 0.21 (0.10 to 0.33)		—	2
Caldwell et al[112] (2019)	Active control, waitlist, curriculum control, no intervention, or attention control.	Universal primary: depression (waitlist)	SMD = −0.09 (−0.77 to 0.54)	High	56 620	12 (Direct trials: 0)
		Universal primary: anxiety (waitlist)	SMD = 0.02 (−0.20 to 0.22)			15 (Direct trials: 0)
		Universal primary: depression (no intervention)	SMD = 0.13 (−0.40 to 0.65)			12 (Direct trials: 0)
		Universal primary: anxiety (no intervention)	SMD = 0.23 (−0.15 to 0.60)			15 (Direct trials: 0)
		Universal primary: depression (attention control)	SMD = −0.07 (−0.79 to 0.62)			12 (Direct trials: 0)
		Universal primary: anxiety (attention control)	SMD = −0.17 (−0.51 to 0.17)			15 (Direct trials: 0)
		Universal primary: depression (CBT)	SMD = −0.13 (−0.44 to 0.17)			12 (Direct trials: 6)
		Universal primary: anxiety (CBT)	SMD = −0.07 (−0.23 to 0.05)			15 (Direct trials: 6)
		Universal primary: depression (behavioral therapy)	SMD = −0.10 (−1.04 to 0.80)			12 (Direct trials: 0)
		Universal secondary: depression (waitlist)	SMD = 0.00 (−0.19 to 0.19)			34 (Direct trials: 0)
		Universal secondary: anxiety (waitlist)	SMD = −0.05 (−0.28 to 0.18)			21 (Direct trials: 0)
		Universal secondary: depression (no intervention)	SMD = 0.03 (−0.15 to 0.21)			34 (Direct trials: 0)
		Universal secondary: anxiety (no intervention)	SMD = −0.07 (−0.34 to 0.20)			21 (Direct trials: 0)

TABLE 2 Continued

Source	Comparison	Outcomes	Pooled Effect Estimates (95% CI)	AMSTAR Rating	Total # of People	Total # of Studies
		Universal secondary: depression (attention control)	SMD = 0.07 (−0.12 to 0.25)			34 (Direct trials: 1)
		Universal secondary: anxiety (attention control)	SMD = −0.15 (−0.51 to 0.16)			21 (Direct trials: 0)
		Universal secondary: depression (CBT)	SMD = −0.04 (−0.16 to 0.07)			34 (Direct trials: 11)
		Universal secondary: anxiety (CBT)	SMD = −0.15 (−0.34 to 0.04)			21 (Direct trials: 3)
		Universal secondary: depression (third wave)	SMD = −0.03 (−0.21 to 0.14)			34 (Direct trials: 1)
		Universal secondary: anxiety (third wave)	SMD = 0.03 (−0.14 to 0.20)			21 (Direct trials: 3)
		Universal secondary: depression (IPT+CBT)	SMD = −0.19 (−0.46 to 0.08)			34 (Direct trials: 0)
		Universal secondary: depression (IPT)	SMD = −0.03 (−0.36 to 0.29)			34 (Direct trials: 1)
		Universal secondary: depression (psychoeducation)	SMD = −0.13 (−0.49 to 0.22)			34 (Direct trials: 1)
		Universal secondary: depression (behavioral therapy)	SMD = −0.02 (−0.40 to 0.37)			34 (Direct trials: 1)
		Universal secondary: anxiety (mindfulness and relaxation)	SMD = −0.65 (−1.14 to −0.19)			21 (Direct trials: 0)
Feiss et al[123] (2019)	Active control, usual care, or no control	Stress	t (10) = −0.36; dexp = −0.05 (−0.58 to 0.48); dctrl = 0.05 (−0.18 to 0.28)	Critically low	420	4
		Anxiety	t (54) = −3.72; dexp = −0.70 (−0.94 to −0.46); dctrl = −0.14 (−0.26 to −0.01)		2166	20
		Depression	t (116) = −3.120; dexp = −0.62 (−0.81 to −0.43); dctrl = −0.22 (−0.34 to −0.10)		6741	38
Mixed setting interventions						
Ciocanel et al[114] (2017)	—	Behavioral adjustment, positive social behaviors	ES = 0.04 (−0.11 to 0.21)	Critically low	—	7
		Behavioral adjustment, problem behaviors	ES = 0.05 (−0.00 to 0.11)		—	16
		Psychological adjustment, all combined	ES = 0.17 (0.04 to 0.31)		—	8
		Psychological adjustment, emotional distress	ES = 0.14 (−0.002 to 0.29)		—	3

TABLE 2 Continued

Source	Comparison	Outcomes	Pooled Effect Estimates (95% CI)	AMSTAR Rating	Total # of People	Total # of Studies
		Psychological adjustment, self-perceptions	ES = 0.19 (0.02 to 0.37)		—	6
		Academic/school outcomes, academic achievement	ES = 0.22 (0.07 to 0.38)		—	10
		Academic/school outcomes, academic adjustment	ES = 0.09 (−0.02 to 0.20)		—	5
		Sexual health outcomes, risky sexual behavior	ES = 0.05 (−0.00 to 0.12)		—	11
Melendez-Torres et al[141] (2016)	—	All substance use outcomes: all time points	d = 0.079 (−0.025 to 0.183)	Moderate	54	9
		All substance use outcomes: short-term time points	d = 0.086 (−0.025 to 0.197)		36	9
		Omnibus substance use outcomes: short-term time points	d = 0.169 (0.012 to 0.326)		10	7
Bennett et al[110] (2015)	—	Anxiety symptoms	SMD = 0.22 (0.14 to 0.29)	Low	—	65
Currier et al[177] (2007)	—	General helpfulness	ES = 0.14 (0.00 to 0.28)	Critically low	—	13
Ekeland et al[120] (2004)	—	Self-esteem	SMD = 0.51 (0.10 to 0.9)	Low	161	4
Pratt et al[143] (2010)	—	Eating attitudes/behaviors and adolescent issues. BMI at 12 – 14-mo follow-up	MD = −0.10 (−0.45 to 0.25)	Low	1235	4
		Eating attitudes/behaviors and adolescent issues. Eating attitudes test (EAT) total at 6 – 12 mo follow-up	SMD = 0.01 (−0.13 to 0.15)		792	4
		Eating attitudes/behaviors and adolescent issues. Eating disorder inventory (EDI), bulimia at 12 – 14-mo follow-up	SMD = −0.03 (−0.16 to 0.10)		955	2
		Media literacy and advocacy. SATQ awareness at 3 mo	SMD = 0.18 (−0.05 to 0.41)		297	2
		Media literacy and advocacy. SPA and SPPC global self-worth at 3 mo	SMD = −0.05 (−0.44 to 0.34)		104	2
		Media literacy and advocacy. Body image assessment at 3 mo	SMD = 0.02 (−0.37 to 0.42)		127	2
		Self-esteem approach; SPA close friendships at 3 mo	MD = −0.01 (−0.09 to 0.06)		524	2
		Self-esteem approach; SPA social acceptance at 3 mo	MD = −0.03 (−0.10 to 0.04)		531	2

TABLE 2 Continued

Source	Comparison	Outcomes	Pooled Effect Estimates (95% CI)	AMSTAR Rating	Total # of People	Total # of Studies
Raposa et al[145] (2019)	—	Average effect of youth mentoring on all outcomes	g = 0.21 (0.14 to 0.28)	Critically low	25 286	70
Schleider et al[150] (2017)	—	Overall SSI effect	ES = 0.32 (0.17 to 0.46)	Critically low	—	50 (299 ESs)
Spruit et al[155] (2016)	—	Internalizing problems	MD = 0.316 (0.073 to 0.558)	Critically low	—	14
		Self-concept	MD = 0.297 (0.127 to 0.468)		—	24
		Academic achievement	MD = 0.367 (0.380 to 0.697)		—	33
		Overall effect size	ES = 0.33 (0.14 to 0.53)		—	10
		Externalizing problems	MD = 0.320 (0.023 to 0.616)		—	7
Salazar de Pablo et al[148] (2020)	Universal/selective interventions for good mental health versus a control group	Mental health literacy	ES = 0.685 (P < .001)	Low	37 533	45
		Emotions	ES = 0.541 (P < .001)		7593	37
		Self-perceptions and values	ES = 0.49 (P < .001)		37 183	92
		Quality of life	ES = 0.457 (P = .001)		31 276	48
		Cognitive skills	ES = 0.428 (P < .001)		12 368	20
		Social skills	ES = 0.371 (P < .001)		62 274	94
		Physical health	ES = 0.285 (P < .001)		7642	25
		Sexual health	ES = 0.257 (P = .017)		14 202	13
		Academic/occupational performance	ES = 0.211 (P < .001)		19 324	30
		Attitude toward mental disorders	ES = 0.177 (P = .006)		8741	16
		Improve behaviors	ES = 0.065 (P = .23)		10 474	11
		Improve family/significant relationships	ES = -0.046 (P = .674)		32 639	45
		Self-management strategies	ES = 0.107 (P = .09)		41 437	86
Vallis et al[159] (2020)	Cognitive behavior interventions compared with passive control groups	Change in anxiety from pretreatment to postintervention	SMD = -1.34 (-1.59 to -1.09)	Moderate	1965	41
		Efficacy of interventions compared with control conditions	SMD = -0.81 (-1.00 to -0.63)		1525	19
		Anxiety decreased from preintervention to follow-up	SMD = -1.40 (-1.75 to -1.06)		1525	19
		Efficacy of intervention, reported by assessor	SMD = -0.86 (SE = 0.12)		—	—
		Efficacy of intervention, reported by parent	SMD = -0.83 (SE = 0.15)		—	—
		Efficacy of intervention, participants with anxiety disorders	SMD = -0.91 (SE = 0.13)		—	—
		Efficacy of intervention, participants with anxiety disorders	SMD = -0.84 (SE = 0.14)		—	—
		Efficacy of intervention, participants with anxiety symptoms	SMD = -0.47 (SE = 0.16)		—	—

TABLE 2 Continued

Source	Comparison	Outcomes	Pooled Effect Estimates (95% CI)	AMSTAR Rating	Total # of People	Total # of Studies
		Efficacy of intervention, participants with behavioral inhibition	SMD = −0.72 (SE = 0.18)		—	—
		Efficacy of intervention, parent focused	SMD = −0.91 (SE = 0.12)		—	—
		Efficacy of intervention, both parent and child focused	SMD = −1.02 (SE = 0.31)		—	—
		Efficacy of intervention, child focused	SMD = −0.85 (SE = 0.10)		—	—
		Efficacy of intervention, delivered individual in person	SMD = −0.89 (SE = 0.18)		—	—
		Efficacy of intervention, delivered in group in person	SMD = −0.45 (SE = 0.24)		—	—
		Efficacy of intervention, delivered over the internet				
Hetrick et al[129] (2016)	Overall evidence-based psychological therapy versus control	Depression diagnoses	RD = −0.05 (−0.08 to −0.02)	High	3232	36
	Overall evidence-based depression prevention program versus control	Depression symptoms self-reported	SMD = −0.21 (−0.27 to −0.15)		13 829	73
	Universal depression prevention programs compared with any comparator	Depression symptoms self-reported	SMD = −0.11 (−0.17 to −0.05)		9013	31
	Overall evidence-based depression prevention program versus control	Depression symptoms clinic related	SMD = −0.23 (−0.41 to −0.05)		2175	11
	Universal depression prevention programs compared with any comparator	Anxiety symptoms	SMD = −0.09 (−0.17 to −0.01)		3130	8
	Overall evidence-based depression prevention program versus control	General and social functioning	SMD = 0.24 (0.06 to 0.41)		2067	10
	Universal depression prevention programs compared with any comparator	General and social functioning	SMD = 0.16 (0.04 to 0.28)		1046	1
Dunning et al[119] (2019)	No contact, waitlist, active or attention placebo control	All measures	d = 0.19 (0.14 to 0.23)	High	3666	33
		Mindfulness	d = 0.24 (0.01 to 0.46)		1475	11
		Social behavior	d = 0.16 (−0.05 to 0.37)		1247	10

TABLE 2 Continued

Source	Comparison	Outcomes	Pooled Effect Estimates (95% CI)	AMSTAR Rating	Total # of People	Total # of Studies
		Negative behavior	d = 0.27 (0.07 to 0.47)		970	11
		Depression	d = 0.27 (0.06 to 0.49)		1529	13
		Anxiety/stress	d = 0.16 (0.04 to 0.27)		2319	20
		Executive functions	d = 0.30 (0.12 to 0.49)		1691	15
		Attention	d = 0.19 (0.04 to 0.34)		1158	8
Digital-based interventions						
Skeen et al[154] (2019)	Universally delivered psychosocial interventions versus control	Positive mental health (face-to-face)	ES = 0.257 (0.097 to 0.416)	Moderate	—	129
		Positive mental health (digital and combined)	ES = 0.197 (0.016 to 0.379)		—	29
		Depression and anxiety symptoms (face-to-face)	ES = −0.088 (−0.151 to −0.025)		—	129
		Depression and anxiety symptoms (digital and combined)	ES = −0.054 (−0.81 to 0.074)		—	29
		Violence, aggression, and bullying (face-to-face)	ES = −0.294 (−0.564 to −0.024)		—	129
		Violence, aggression, and bullying (digital and combined)	ES = −0.075 (−0.249 to 0.099)		—	29
		Substance use (face-to-face)	ES = −0.04 (−0.117 to 0.037)		—	129
		Substance use (digital and combined)	ES = −0.114 (−0.199 to −0.029)		—	29

—, not reported.

Other Interventions

Three reviews included interventions without reference to a specific delivery strategy. Taxation, public consumption bans, advertising restrictions, and minimum legal age reduce alcohol and tobacco use.[99] Universal multicomponent interventions reduce alcohol use.[92]

Self-Harm Prevention

Two reviews synthesized data or narratively reported on self-harm prevention interventions. Self-harm is more common in adolescents (12–18 years) than children.[63] However, interventions targeted at school-aged children may help to prevent adolescent self-harm.

Mixed-Setting Interventions

One review examined interventions that were designed to improve the ability of gatekeepers to prevent suicide-related crises in young people by recognizing risks and responding appropriately.[65] Gatekeeper training is associated with significant moderate-to-large improvements in suicide literacy outcomes (eg, knowledge of suicide, confidence to intervene, and attitudes toward suicide).[65] The second review examined primary prevention interventions, such as knowledge promotion, reducing access to means, local media reporting, local suicide plans, and screening for suicide risk.[63] The review assessed multiple settings and found that school-based interventions prevent suicidal ideation and attempts short term, and possibly suicide attempts long term.[63]

Nurturing Care (Responsive Caregiving, Safety and Security, and Early Learning to Support Positive Development)

Thirty-eight reviews synthesized data or narratively reported on nurturing care interventions.

TABLE 3 Bullying Prevention Meta-Analysis Results

Source	Comparison	Outcomes	Pooled Effect Estimates (95% CI)	AMSTAR Rating	Total # of People	Total # of Studies
School-based interventions						
Gaffney et al[68] (2019)	School-based sessions versus no intervention	Cyberbullying perpetration (random effects model)	OR = 1.233 (1.04 to 1.46)	Critically low	—	18
		Cyberbullying perpetration (fixed effects model)	OR = 1.144 (1.06 to 1.23)		—	18
		Cyberbullying perpetration (multiplicative variance adjustment)	OR = 1.144 (0.99 to 1.33)		—	18
		Victimization (random effects model)	OR = 1.227 (1.05 to 1.44)		—	19
		Victimization (fixed effects model)	OR = 1.231 (1.15 to 1.32)		—	19
		Victimization (multiplicative variance adjustment)	OR = 1.231 (1.08 to 1.40)		—	19
Jiménez-Barbero et al[70] (2016)	Curriculum-based intervention versus no intervention	Bullying or school violence frequency	d = −0.12 (−0.17 to −0.06)	Critically low	—	14
		Victimization frequency	d = −0.09 (−0.18 to 0.01)		—	8
		Attitudes favoring bullying or school violence	d = −0.18 (−0.30 to −0.06)		—	3
		Attitudes against bullying or school violence	d = 0.06 (0.03 to 0.10)		—	4
		School climate	d = −0.03 (−0.08 to 0.02)		—	3
Ttofi and Farrington[76] (2009)	—	Bullying (randomized experiments)	OR = 1.10 (0.97 to 1.26)	Critically low	—	14
		Bullying (before-after, experimental-control)	OR = 1.60 (1.45 to 1.77)		—	14
		Bullying (other experimental-control)	OR = 1.20 (1.04 to 1.38)		—	4
		Bullying (age-cohort designs)	OR = 1.51 (1.35 to 1.70)		—	9
		Bullying (total weighted ean)	OR = 1.36 (1.26 to 1.47)		—	41
		Victimization (randomized experiments)	OR = 1.17 (1.00 to 1.37)		—	11
		Victimization (before-after, experimental-control)	OR = 1.22 (1.06 to 1.37)		—	17
		Victimization (other experimental-control)	OR = 1.43 (1.11 to 1.85)		—	4
		Victimization (age-cohort designs)	OR = 1.44 (1.21 to 1.72)		—	9
		Victimization (total weighted mean)	OR = 1.29 (1.18 to 1.42)		—	41
Gaffney et al[69] (2021)	—	School-bullying perpetration	Multivariance adjustment model (MVA): OR = 1.324 (1.27 to 1.38). Random effects model (RE): OR = 1.308 (1.24 to 1.38)	Low	—	81 evaluations
		School-bullying victimization	MVA: OR = 1.248 (1.20 to 1.29. RE: OR = 1.242 (1.18 to 1.30)		—	84 evaluations
Fraguas et al[67] (2021)	—	Overall bullying (end of intervention)	Cohen d = −0.150 (−0.191 to −0.109)	Critically low	Intervention: 46 847; Control: 45 744	45

TABLE 3 Continued

Source	Comparison	Outcomes	Pooled Effect Estimates (95% CI)	AMSTAR Rating	Total # of People	Total # of Studies
		Overall bullying (follow-up)	d = −0.171 (−0.243 to −0.099)		11 020; 11 977	21
		Bullying perpetration (end of intervention)	d = −0.111 (−0.146 to −0.077)		43 199; 42 991	35
		Bullying perpetration (follow-up)	d = −0.175 (−0.276 to −0.073)		7889; 7993	17
		Bullying exposure (end of intervention)	d = −0.158 (−0.225 to −0.092)		37 190; 37 001	32
		Bullying exposure (follow-up)	d = −0.122 (−0.173 to −0.071)		6971; 7629	13
		Cyberbullying (end of intervention)	d = −0.135 (−0.201 to −0.069)		3271; 2472	5
		Attitudes that discourage bullying (end of intervention)	d = 0.195 (0.145 to 0.245)		20 537; 17 778	25
		Attitudes that discourage bullying (follow-up)	d = 0.143 (0.083 to 0.202)		5517; 4596	14
		Attitudes that encourage bullying (end of intervention)	d = −0.115 (−0.184 to −0.046)		15 884; 14 037	15
		Attitudes that encourage bullying (follow-up)	d = −0.123 (−0.197 to −0.048)		3329; 3299	7
		Mental health problems (end of intervention)	d = −0.205 (−0.277 to −0.133)		14 543; 14 649	20
		Mental health problems (follow-up)	d = −0.202 (−0.347 to −0.056)		1605; 1621	6
		School climate (end of intervention)	d = 0.07 (0.044 to 0.096)		11 417; 11 995	12
		School climate (follow-up)	d = 0.135 (0.037 to 0.233)		2647; 2978	5
Lee et al[72] (2015)	No intervention	Bullying victimization	d = −0.151 (−0.201 to −0.101)	Critically low	—	13
		Subgroup analysis: school grade level	Secondary school: d = −0.315; Primary school: d = −0.135, P < .05		—	—

—, not reported.

Twenty-nine studies were identified which reported mixed effects of interventions on children's social, emotional, and behavioral outcomes in a wide range of delivery strategies. Nine out of 29 studies reported safety and security interventions, which focused on prevention of child and adolescent maltreatment, and promotion of mental and physical well-being in abused or neglected children. Early learning and positive development interventions were reported in 16 reviews, which focused on academics, positive development, and positive connections to improve developmental outcomes and a positive transition into adulthood. School- and community-based interventions had positive effects on school-aged children's mental health and developmental outcomes.

Community-Based Interventions

Eighteen reviews reported family-based interventions. Improved parenting responsiveness resulted in better health and development in younger children, especially in poor settings.[41] The Multilevel Triple P-Positive Parenting Program system showed improvements in children's social, emotional, and behavioral outcomes (SMD = 0.525; 95% CI: 0.358 to 0.692); parenting practices (SMD = 0.498; 95% CI: 0.362 to 0.634); parenting satisfaction and efficacy (SMD = 0.551; 95% CI: 0.372 to 0.730); parental adjustment (SMD = 0.481; 95% CI: 0.321 to 0.641); and parental relationship (SMD = 0.230; 95% CI: 0.136 to 0.325).[48] Physical activity interventions showed improvements in motor skills and cognitive development in children aged <6 years.[36] After-school programs promoted positive behaviors, including self-care (SMD = 0.503; 95% CI: 0.097 to 0.910) and reduced negative behaviors.[37] Physical activity interventions improved self-concept

TABLE 4 Substance Abuse Prevention Meta-Analysis Results

Source	Comparison	Outcomes	Pooled Effect Estimates (95% CI)	AMSTAR Rating	Total # of People	Total # of Studies
School-based interventions						
Faggiano et al[89] (2008)	Skills-based interventions compared with usual curricula	Marijuana use	RR = 0.82 (0.73 to 0.92)	Critically low	7287	2
	Skills-based interventions compared with usual curricula	Drug use	RR = 0.81 (0.64 to 1.02)		2371	2
	Skills-based interventions compared with usual curricula	Hard drug use	RR = 0.45 (0.24 to 0.85)		746	2
	Skills-based interventions compared with usual curricula	Decision-making	SMD = 0.78 (0.46 to 1.09)		1229	2
	Affective versus usual curricula	Drug knowledge	SMD = 1.88 (1.27 to 2.50)		63	2
	Affective versus usual curricula	Decision making skills	SMD = 1.35 (0.79 to 1.91)		63	2
	Knowledge versus usual curricula	Drug knowledge	SMD = 0.91 (0.42 to 1.39)		220	3
	Knowledge versus usual curricula	Decision making skills	SMD = −0.06 (−0.60 to 0.47)		55	2
	Skills versus knowledge	Drug knowledge	SMD = 0.02 (−0.18 to 0.22)		522	2
	Skills versus knowledge	Self-efficacy	SMD = 0.13 (−0.37 to 0.63)		522	2
	Affective versus knowledge	Drug knowledge	SMD = 0.60 (0.18 to 1.03)		91	2
	Affective versus knowledge	Decision making skills	SMD = 1.22 (0.33 to 2.12)		64	2
	Interactive versus passive techniques	Drug knowledge	SMD = 0.02 (−0.18 to 0.22)		522	2
	Interactive versus passive techniques	Self-efficacy	SMD = 0.13 (−0.37 to 0.63)		522	2
Faggiano et al[90] (2014)	Social competence versus usual curricula	Marijuana use <12 mo	RR = 0.9 (0.81 to 1.01)	Low	9456	4
	Social competence versus usual curricula	Any drug use <12 mo	RR = 0.27 (0.14 to 0.51)		2512	2
	Social influence versus usual curricula	Marijuana use <12 mo	RR = 0.88 (0.72 to 1.07)		10c716	3
	Combined versus usual curricula	Marijuana use <12 mo	RR = 0.79 (0.59 to 1.05)		8701	3
	Combined curricula versus usual curricula	Marijuana use ≥12 mo	RR = 0.83 (0.69 to 0.99)		26c910	6
	Combined curricula versus usual curricula	Hard drug use ≥12 mo	RR = 0.86 (0.39 to 1.90)		1066	2
Espada et al[88] (2015)	—	Program effectiveness: global	d = 0.16 (0.10 to 0.22)	Critically low	Total in post-test = 10c956; total in follow-up = 9149	36
		Knowledge of drugs	d = 0.34 (0.23 to 0.45)			18

TABLE 4 Continued

Source	Comparison	Outcomes	Pooled Effect Estimates (95% CI)	AMSTAR Rating	Total # of People	Total # of Studies
		Attitudes toward drugs	d = 0.44 (0.33 to 0.54)			15
		Intention	d = 0.23 (0.14 to 0.32)			14
		Drug consumption	d = 0.18 (0.11 to 0.26)			20
		Alcohol	d = 0.33 (0.27 to 0.49)			20
		Tobacco	d = 0.20 (0.10 to 0.30)			12
		Cannabis	d = 0.19 (0.05 to 0.32)			11
		Other drugs	d = 0.19 (0.10 to 0.28)			23
Thomas et al[101] (2013)	Intervention curricula versus control	Smoking prevention at 1 y follow up	OR = 0.94 (0.85 to 1.05)	High	142 447	49
	Social competence and social influences curricula versus control	Smoking prevention at 1 y follow up	OR = 0.49 (0.28 to 0.87)			6
	Social influences only versus control	Smoking prevention at 1 y follow up	OR = 1.00 (0.88 to 1.13)			16
	Multimodal interventions versus control	Smoking prevention at 1 y follow up	OR = 0.89 (0.73 to 1.08)			3
	Intervention curricula versus control	Smoking prevention at longest follow up	OR = 0.88 (0.82 to 0.96)			—
	Social competence and social influences curricula versus control	Smoking prevention at longest follow up	OR = 0.50 (0.28 to 0.87)			8
	Social influences only versus control	Smoking prevention at longest follow up	OR = 0.52 (0.30 to 0.88)			5
	Intervention curricula versus control	Change in smoking behavior over time, at 1 y follow up	SMD = 0.04 (0.02 to 0.06)			8
	Social influences only versus control	Change in smoking behavior over time, at 1 y follow up	SMD = 0.04 (0.03 to 0.06)			6
	Intervention curricula versus control	Change in smoking behavior over time, at longest follow up	SMD = 0.01 (0.00 to 0.02)			15
	Social influences only versus control	Change in smoking behavior over time, at longest follow up	SMD = 0.05 (0.03 to 0.06)			10
	Peer- versus adult-led interventions	Point prevalence of smoking at 1 y follow up	OR = 0.46 (0.26 to 0.84)			—
		Point prevalence of smoking at longest follow up	OR = 0.88 (0.81 to 0.96)			—
	Social competence versus control	Point prevalence of smoking at longest follow up	OR = 0.52 (0.30 to 0.88)			—
	Effect of adding booster sessions	Point prevalence of smoking at 1 y follow up	OR = 0.94 (0.85 to 1.05)			36

TABLE 4 Continued

Source	Comparison	Outcomes	Pooled Effect Estimates (95% CI)	AMSTAR Rating	Total # of People	Total # of Studies
		Point prevalence of smoking at longest follow up	OR = 0.90 (0.83 to 0.97)		—	66
Community-based interventions						
Gilligan et al[94] (2019)	Any family-based intervention versus no intervention/standard care	Prevalence of alcohol use	SMD = 0.00 (–0.08 to 0.08)	Low	7490	12
	Universal family-based intervention versus no intervention/standard care	Prevalence of alcohol use	SMD = 0.02 (–0.06 to 0.11)		189	10
	Selective or indicated family-based intervention versus no intervention/standard care	Prevalence of alcohol use	SMD = –0.16 (–0.36 to 0.05)		357	2
		Prevalence of alcohol use, minority ethnic group	SMD = –0.20 (0.42 to 0.02)		325	3
	Any family-based intervention versus no intervention/standard care	Frequency of alcohol use	SMD = –0.31 (–0.8 to 0.21)		1835	8
	Universal family-based intervention versus no intervention/standard care	Frequency of alcohol use	SMD = 0.18 (–0.40 to 0.75)		1090	3
	Selective or indicated family-based intervention versus no intervention/standard care	Frequency of alcohol use	SMD = –0.65 (1.64 to 0.33)		745	5
		Frequency of alcohol use, ethnic minority groups	SMD = –1.19 (2.83 to 0.46)		1037	3
	Any family-based intervention versus no intervention/standard care	Vol of alcohol use	SMD = –0.14 (–0.27 to 0.00)		1825	5
	Universal family-based intervention versus no intervention/standard care	Vol of alcohol use	SMD = –0.21 (–0.32 to –0.10)		1481	3
	Selective or indicated family-based intervention versus no intervention/standard care	Vol of alcohol use	SMD = 0.06 (–0.15 to 0.27)		344	2
		Vol of alcohol use, ethnic minority groups	SMD = –0.24 (–0.36 to –0.12)		1081	3
	Any family-based and adolescent interventions versus interventions with young people alone	Prevalence of alcohol use	SMD = –0.39 (–0.91 to 0.14)		5640	4
	Universal family-based and adolescent interventions versus interventions with young people alone	Prevalence of alcohol use	SMD = –0.44 (–1.08 to 0.20)		5351	3
		Frequency of alcohol use	SMD = –0.16 (–0.42 to 0.09)		915	4

TABLE 4 Continued

Source	Comparison	Outcomes	Pooled Effect Estimates (95% CI)	AMSTAR Rating	Total # of People	Total # of Studies
Carson et al[85] (2011)	Multicomponent community-based interventions in influencing smoking behavior versus no intervention	Smoking, daily intervention duration 13 mo or more	OR = 0.89 (0.69 to 1.15)	High	1304	2
		Smoking, weekly	OR = 1.00 (0.90 to 1.11)		11c363	6
		Smoking, monthly	OR = 0.98 (0.84 to 1.14)		18c677	8
		Smoking, ever smoked. Intervention duration 12 mo or less	OR = 0.82 (0.39 to 1.74)		—	3
		Smokeless tobacco use	OR = 0.78 (0.50 to 1.22)		7667	3
		Intervention duration 13 mo or more. Behaviors rules on smoking	OR = 1.10 (1.02 to 1.18)		—	2
		Perceptions, peer smoking	OR = 0.98 (0.78 to 1.24)		—	2
Thomas et al[100] (2011)	Mentoring versus no intervention	Alcohol use. Nondrinkers at baseline (12-mo or 18-mo follow-up period)	RR = 0.71 (0.57 to 0.90)	Low	1116	2
Thomas et al[102] (2015)	Family-based interventions versus no intervention control. Family plus school intervention versus a school intervention only	New smoking at follow-up. Baseline never smokers only	RR = 0.76 (0.68 to 0.84)	Low	4810	9
		New smoking at follow-up. Baseline never smokers only	RR = 0.85 (0.75 to 0.96))		2301	2
O'Connor et al[98] (2020)	General prevention trials	Primary drug use outcome (KQ2) for general prevention	SMD = −0.08 (−0.16 to 0.00)	Critically low	12 801	24
		Any illicit drug use	OR = 0.82 (0.67 to 1.04)		9031	11
		Any cannabis use	OR = 0.78 (0.64 to 0.95)		6520	6
		Times used in previous 3 mo	MD = −0.21 (−0.44 to 0.02)		3651	12
		Times used cannabis in previous 3 mo	MD = −0.23 (−0.48 to 0.01)		3616	10
		Primary alcohol outcome	SMD = −0.11 (−0.16 to −0.07)		12 307	24
		Any alcohol use	OR = 0.79 (0.64 to 0.96)		5854	6
		Risky alcohol use	OR = 0.92 (0.72 to 1.17)		5078	5
		Times used alcohol in previous 3 mo	MD = −0.29 (−0.53 to −0.05)		3192	8
		Primary tobacco outcome	SMD = −0.09 (−0.15 to −0.03)		8366	16
		Any tobacco use	OR = 0.91 (0.73 to 1.14)		5373	7
		Times used tobacco in previous 3 mo	MD = −0.30 (−0.58 to 0.02)		2893	8
Digital-based interventions						
Boumparis et al[84] (2019)	Digital intervention to reduce cannabis use versus nonactive control	Cannabis use	OR 0.33 (0.13 to 0.54)	Critically low	2564	6

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TABLE 4 Continued

Source	Comparison	Outcomes	Pooled Effect Estimates (95% CI)	AMSTAR Rating	Total # of People	Total # of Studies
Mixed setting interventions						
Hefler et al[95] (2017)	Incentives for preventing smoking	Smoking initiation among children and adolescents-RCTs	RR = 1.00 (0.84 to 1.19)	High	1108	3
		Smoking initiation among children and adolescents. Controlled trials	RR = 0.82 (0.63 to 1.08)		1377	3
MacArthur et al[97] (2018)	Universal school sessions versus no intervention	Tobacco use, short-term usage	ES = 0.77 (0.60 to 0.97)	High	15 354	9
	Targeted school sessions versus no intervention	Tobacco use, long-term usage	ES = 0.6 (0.33 to 1.09)		879	2
	Universal school sessions versus no intervention	Alcohol use, short-term usage	ES = 0.72 (0.56 to 0.92)		8751	8
	Targeted school sessions versus no intervention	Alcohol use, long-term usage	ES = 1.34 (0.55 to 3.27)		566	1
	Universal school sessions versus no intervention	Illicit drug use, short-term usage	ES = 0.96 (0.79 to 1.18)		1299	2
	Targeted school sessions versus no intervention	Illicit drug use, long-term usage	ES = 0.74(0.55 to 1.00)		11c058	5
	Universal school sessions versus no intervention	Cannabis use, short-term usage	ES = 1.1 (0.69 to 1.76)		126	2
	Universal school sessions versus no intervention	Cannabis use, short-term usage	ES = 1.02 (0.52 to 2.02)		380	3
	Targeted school sessions versus no intervention	Cannabis use, long-term usage	ES = 0.79 (0.62 to 1.01)		4140	5
	Universal school sessions versus no intervention	Cannabis use, long-term usage	ES = 0.82 (0.51 to 1.32)		806	2
	No intervention/ usual practice	Cannabis use, long-term usage	ES = 1.13 (0.40 to 3.21)		566	1
	Targeted family sessions versus no intervention	Tobacco use, short-term usage	OR = 0.78 (0.40 to 1.53)		313	2
	Targeted family sessions versus no intervention	Tobacco use, long-term usage	OR = 0.82 (0.32 to 2.14)		1177	2
	Universal family sessions versus no intervention	Tobacco use, long-term usage	OR = 0.82 (0.38 to 1.78)		237	1
	Targeted family sessions versus no intervention	Alcohol use, short-term usage	OR = 0.83 (0.47 to 1.46)		417	3
	Targeted family sessions versus no intervention	Alcohol use, long-term usage	OR = 0.73 (0.52 to 1.03)		762	2
	Targeted family sessions versus no intervention	Illicit drug use, short-term usage	OR = 0.94 (0.71 to 1.25)		638	3
	Universal family sessions versus no intervention	Illicit drug use, short-term usage	OR = 0.74 (0.42 to 1.31)		69	1
			OR = 1.07 (0.19 to 6.21)		819	2

TABLE 4 Continued

Source	Comparison	Outcomes	Pooled Effect Estimates (95% CI)	AMSTAR Rating	Total # of People	Total # of Studies
	Targeted family sessions versus no intervention	Illicit drug use, long-term usage	OR = 0.69 (0.46 to 1.04)		362	2
	Targeted family sessions versus no intervention	Cannabis use, short term usage	OR = 0.53 (0.28 to 1.02)		340	2
	Targeted family sessions versus no intervention	Cannabis use, long-term usage	OR = 0.8 (0.44 to 1.45)		237	1
	Universal family sessions versus no intervention	Cannabis use, long-term usage	OR = 0.98 (0.35 to 2.73)		521	2
	Targeted sessions versus no intervention	Tobacco use, short-term usage	OR = 1.03 (0.32 to 3.27)		1549	2
	Universal sessions versus no intervention	Tobacco use, short-term usage	OR = 1.08 (0.56 to 2.11)		397	1
	Targeted sessions versus no intervention	Tobacco use, long-term usage	OR = 1.02 (0.80 to 1.31)		2044	4
	Targeted sessions versus no intervention	Alcohol use, short-term usage	OR = 0.8 (0.58 to 1.11)		1911	4
	Targeted sessions versus no intervention	Alcohol use, long-term usage	OR = 1.24 (0.69 to 2.24)		1417	3
	Targeted sessions versus no intervention	Alcohol use, long-term usage	OR = 0.86 (0.47 to 1.55)		237	1
	Targeted sessions versus no intervention	Illicit drug use, long- term usage	OR = 0.8 (0.52 to 1.24)		2032	4

—, not reported.

(hedges g = 0.49; 95% CI: 0.10 to 0.88), self-worth (g = 0.31; 95% CI: 0.13 to 0.49), and inhibitory control (d = 0.2; 95% CI: 0.03 to 0.37) in children aged 0 to 19 years.[26,28]

School-Based Interventions

School-based programs for sexual abuse prevention improved protective behaviors (OR = 5.71; 95% CI: 1.98 to 16.51) and knowledge (SMD = 0.61; 95% CI: 0.45 to 0.78).[56] School-based universal SEL interventions significantly improved social and emotional distress (mean effect [ME] = 0.24; 95% CI: 0.14 to 0.35); attitudes (ME = 0.23; 95% CI: 0.16 to 0.30); positive behavior (ME = 0.24; 95% CI: 0.16 to 0.32); conduct problems (ME = 0.22; 95% CI: 0.16 to 0.29); and academic performance (ME = 0.27; 95% CI: 0.15 to 0.39) in children aged 5 to 18 years.[24] After-school programs demonstrated a significant increase in overall effect (SMD = 0.22; 95% CI: 0.16 to 0.29); self-perceptions (SMD = 0.34; 95% CI: 0.23 to 0.46); positive behaviors (SMD = 0.19; 95% CI: 0.10 to 0.29); levels of academic achievement (SMD = 0.17; 95% CI:0.06 to 0.29); and reductions in problem behaviors (SMD = 0.19 95% CI: 0.10 to 0.27).[23] School-based universal programs[34] and pull-out programs[35] targeting aggressive behavior in children and adolescents reported positive effects with short, intensive interventions compared with extended yearlong programs. Universal school-based resilience interventions[25] and health education curriculums[30] showed reduction in illicit substance use.

Mixed-Setting Interventions

Fifteen reviews reported on mixed settings including schools, day care, communities, and households. Community-based parenting interventions showed positive effects on measures of good parenting, with positive flow-on effects to some aspects of challenging adolescent behaviors including

TABLE 5 Self-Harm Meta-Analysis Results

Source	Comparison	Outcomes	Pooled Effect Estimates (95% CI)	AMSTAR Rating	Total # of People	Total # of Studies
Mixed setting interventions						
Morken et al[63] (2019)	Children and adolescents between the ages of 10 and 23. School-based suicide prevention programs versus TAU, alternative interventions, wait list or no intervention	Suicidal ideation	RR = 0.67 (0.48 to 0.93)	Critically low	13936	5
		Suicide attempts (3- to 12-mo follow-up)	RR = 0.53 (0.36 to 0.80)		14042	5
	Adolescents, 12- to 19-y-olds, with a history of multiple episodes of self-harm. Dialectical behavior therapy for adolescents (DBT-A). Control: TAU or enhanced TAU	Repetition of self-harm; between 16 wk and 6 mo follow-up-period	OR = 0.72 (0.12 to 4.40)		105	2
		Frequency of self-harm; between 16 wk and 6 mo follow-up-period	MD = −0.79 (−2.78 to 1.20)		104	2
		Suicidal ideation; between 16 wk and 12 mo follow-up-period	SMD = −0.62 (−1.07 to −0.16)		100	2
	Adolescents, 12- to 17-y-olds, referred to child and adolescent services after an episode of intentional self-injury or self-poisoning, irrespective of intent. Developmental group therapy versus TAU	Repetition of self-harm; 6-mo follow-up period	OR = 1.72 (0.56 to 5.24)		430	2
		Repetition of self-harm; 12-mo follow-up period	OR = 0.80 (0.22 to 2.97)		490	3
		Depression (scale not reported); 12-mo follow-up period	MD = −0.93 (−4.03 to 2.17)		473	3
		Suicidal ideation (scale not reported); 12- mo follow-up period	MD = −1.51 (−9.62 to 6.59)		471	3

parent–child communication, smoking reduction, and parental reactions.[43,47,49] Individual and group-based, child-focused, and behavioral parenting interventions showed reduction in disruptive behavior problems (SMD = −0.38; 95% CI: −0.51 to −0.24) among school-aged children in LMIC.[40] Use of activity- and occupation-based interventions, including video game interventions, showed positive effects on mental, behavioral, and physical health in children and youth.[19,32] Positive youth development (PYD) programs showed positive effects on behaviors, including substance use and risky sexual activity, and/or more distal developmental outcomes.[20,22]

Evidence from LMIC

Forty-nine reviews covered populations in both HIC and LMIC; however, most studies captured by these reviews were in HIC and, thus, makes generalizability of findings to LMIC difficult. We found 8 reviews which encompassed LMIC studies only. Interventions considered were PYD programs, school tobacco policies, school-based antibullying or mental health promotion interventions, and peer-facilitated, community-based interventions for mental health disorders and substance use. There was promising evidence for PYD programs, and findings from multiple reviews suggest that interventions that promote mental health in young people can be implemented effectively in LMIC school and community settings. However, overwhelmingly, all reviews point to the dearth of evidence that exists for interventions in the LMIC context, where some reviews only captured 1 study for inclusion.

DISCUSSION

Summary of the Evidence

We summarize findings from 162 reviews, where 78 studies meta-analyzed data. Findings for targeted

TABLE 6 Nurturing Care Meta-Analysis Results

Source	Comparison	Outcomes	Pooled Effect Estimates (95% CI)	AMSTAR Rating	Total # of People	Total # of Studies
School-based interventions						
Bastounis et al[17] (2016)	School-based Penn Resiliency Program (PRP) compared with active control, nonintervention, and waiting list	Depression	MD = −0.23 (−1.09 to 0.62)	Critically low	4744	9
		Anxiety	SMD = 0.13 (0.00 to 0.26)		1518	4
		Explanatory style	MD = 0.80 (−1.04 to 2.63)		1063	3
Durlak et al[23] (2010)	After-school programs (ASP) compared with controls	Overall effect of ASP	SMD = 0.22 (0.16 to 0.29)	Critically low	—	68
		Child self-perception	SMD = 0.34 (0.23 to 0.46)		—	23
		School bonding	SMD = 0.14 (0.03 to 0.25)		—	28
		Positive social behavior	SMD = 0.19 (0.10 to 0.29)		—	36
		Problem behaviors	SMD = 0.19 (0.10 to 0.27)		—	43
		Drug use	SMD = 0.10 (0.00 to 0.20)		—	28
		Achievement test scores	SMD = 0.17 (0.06 to 0.29)		—	20
		School grades	SMD = 0.12 (0.01 to 0.23)		—	25
		School attendance	SMD = 0.10 (−0.01 to 0.20)		—	21
Durlak et al[24] (2011)	School-based universal social and emotional learning (SEL) programs compared with controls	Grand study-level mean for improvement in students' skills, attitudes, and behaviors	ES = 0.30 (0.26 to 0.33)	Critically low	270 034	213 interventions
		SEL skills	ES = 0.57 (0.48 to 0.67)		—	68 interventions
		Attitudes	ES = 0.23 (0.16 to 0.30)		—	106 interventions
		Positive social behavior	ES = 0.24 (0.16 to 0.32)		—	86 interventions
		Conduct problems	ES = 0.22 (0.16 to 0.29)		—	112 interventions
		Emotional distress	ES = 0.24 (0.14 to 0.35)		—	49 interventions
		Academic performance	ES = 0.27 (0.15 to 0.39)		—	35 interventions
Hodder et al[25] (2017)	Universal school-based resilience intervention compared with no intervention, usual practice, attention only or an alternate intervention	Tobacco: overall analysis	OR = 0.96 (0.85 to 1.08)	Moderate	—	12
		Alcohol: overall analysis	OR = 0.86 (0.73 to 1.02)		—	13
		Illicit substances: overall analysis	OR = 0.78 (0.66 to 0.93)		—	10
Klingbeil et al[27] (2017)	Mindfulness-based interventions compared with control	Average treatment effect in pretest-posttest	ĝ = 0.305 (0.223 to 0.387)	Low	1075	30
		Average treatment effect in controlled studies	ĝ = 0.322 (0.242 to 0.402)		4811	48
		Average treatment effect in pretest-posttest: follow-up	ĝ = 0.462 (0.202 to 0.723)		532	12
		Average treatment effect in controlled studies: follow-up	ĝ = 0.402 (0.220 to 0.584)		1501	12

TABLE 6 Continued

Source	Comparison	Outcomes	Pooled Effect Estimates (95% CI)	AMSTAR Rating	Total # of People	Total # of Studies
		Mindfulness	pretest-posttest: g = 0.174 (0.032 to 0.316). Controlled: g = 0.510 (0.082 to 0.939)		Pre-post: 213; Controlled: 1108	Pre-post: 12; Controlled: 15
		Attention	pretest-posttest: g = 0.324 (0.232 to 0.415). Controlled: g = 0.291 (0.124 to 0.456)		557; 1243	8; 10
		Meta-cognition and cognitive flexibility	n/a; Controlled: g = 0.404 (0.011 to 0.798)		33; 806	3; 9
		Emotional or behavioral regulation	pretest-posttest: g = 0.297 (0.213 to 0.381); Controlled: g = 0.322 (0.180 to 0.464)		976; 1404	17; 16
		Academic achievement and school functioning	pretest-posttest: g = 0.321 (0.132 to 0.511); Controlled: g = 0.393 (−0.153 to 0.939)		516; 434	7; 5
		Externalizing problems	pretest-posttest: g = 0.145 (0.032 to 0.258); Controlled: g = 0.296 (0.087 to 0.505)		388; 871	10; 9
		Internalizing problems	Pretest-posttest: g = 0.262 (0.161 to 0.362); Controlled: g = 0.392 (0.267 to 0.391)		527; 2941	17; 29
		Negative emotions and subjective distress	Pretest-posttest: g = 0.323 (0.125 to 0.521); Controlled: g = 0.254 (0.123 to 0.385)		408; 2342	12; 21
		Positive emotions and self-appraisal	Pretest-posttest: g = 0.342 (0.165 to 0.519); Controlled: g = 0.280 (0.092 to 0.468)		487; 2321	15; 22
		Physical health	Pretest-posttest: g = 0.492 (−0.130 to 1.113); Controlled: g = 0.282 (0.173 to 0.391)		308; 994	7; 14
		Social competence and prosocial behaviors	Pretest-posttest: g = 0.214 (0.092 to 0.335); Controlled: g = 0.368 (0.165 to 0.570)		905; 1105	12; 12
Melendez-Torres et al[30] (2018)	Integrated academic and health education compared with treatment as usual	Alcohol (school grade7–9 y; aged 11–14 y)	SMD = −0.11 (−0.23 to 0.004)	High	23	5
		Smoking (school grade 7–9; aged 11–14 y)	SMD = −0.05 (−0.12 to 0.02)		13	5
		Illicit drug use: marijuana (school grade 7–9; aged 11–14 y)	SMD = −0.10 (−0.16 to −0.04)		10	5
		Illicit drug use (school grade 7–9; aged 11–14 y)	SMD = −0.07 (−0.14 to −0.01)		14	5
		All drug use outcomes (school grade 7–9; aged 11-14 y)	SMD = −0.09 (−0.17 to −0.01)		55	5

TABLE 6 Continued

Source	Comparison	Outcomes	Pooled Effect Estimates (95% CI)	AMSTAR Rating	Total # of People	Total # of Studies
		Alcohol (school grade 10–11; aged 14–16 y)	SMD = −0.01 (−0.09 to 0.06)		15	3
		Smoking (school grade 10–11; aged 14–16 y)	SMD = −0.08 (−0.15 to −0.01)		9	3
		Illicit drug use: marijuana (school grade 10–11; aged 14–16 y)	SMD = −0.10 (−0.17 to −0.03)		10	3
		All drug use outcomes (school grade 10–11; aged 14–16 y)	SMD = −0.06 (−0.09 to −0.02)		34	3
Maynard et al[29] (2017)	Mindfulness-based interventions compared with wait list control, no treatment, treatment-as-usual or alternative treatment groups	Cognitive outcomes	ES = 0.25 (0.06 to 0.43)	High	—	10
		Academic outcomes	ES = 0.27 (−0.04 to 0.58)		—	5
		Behavioral outcomes	ES = 0.14 (−0.02 to 0.30)		—	13
		Socioemotional outcomes	ES = 0.22 (0.14 to 0.30)		—	28
Walsh et al[56] (2018)	School-based education programs for the prevention of child sexual abuse compared with wait-listed control	Protective behaviors	OR = 5.71 (1.98 to 16.51)	High	102	2
		Questionnaire-based knowledge	SMD = 0.61 (0.45 to 0.78)		4657	18
		Vignette-based knowledge	SMD = 0.45 (0.24 to 0.65)		1688	11
		Retention of knowledge over time	SMD = 0.78 (0.38 to 1.17)		956	4
		Disclosure of previous or current sexual abuse	OR = 3.56 (1.13 to 11.24)		1788	3
Wilson et al[34] (2006)	No-treatment or wait-list control.	Aggressive and disruptive behavior	Random effects mean 0.21 ($P < .01$)	Critically low	—	73
Wilson et al[35] (2006)	No-treatment or wait-list Control.	Aggressive and disruptive behavior	Random effects mean 0.26 ($P < .01$)	Critically low	—	47
Community-based interventions						
Dowdall et al[21] (2020)	Shared picture book readings interventions compared with Passive and active controls	Expressive language outcomes	d = 0.41 (0.20 to 0.61)	Low	1664	16
		Receptive language outcomes	d = 0.26 (0.12 to 0.40)		1871	16
		Caregiving competence outcomes	d = 1.01 (0.40 to 1.63)		481	6
Jackson et al[26] (2016)	Exercise programs compared with normal activity or waitlist control	Inhibitory control (RCTs)	d = 0.2 (0.03 to 0.37)	Critically low	770	8
Liu et al[28] (2015)	Physical activity (PA) interventions compared with nonphysical activity control or comparison group	General self-outcomes (RCTs)	g = 0.29 (0.14 to 0.45)	Critically low	—	18
		Self-concept (RCTs)	g = 0.49 (0.10 to 0.88)		—	18
		Self-worth (RCTs)	g = 0.31 (0.13 to 0.49)		—	18
		General self-outcomes (non-RCTs)	g = 0.33 (−0.35 to 1.01)		—	6

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TABLE 6 Continued

Source	Comparison	Outcomes	Pooled Effect Estimates (95% CI)	AMSTAR Rating	Total # of People	Total # of Studies
Macbeth et al[46] (2015)	Mellow parenting interventions versus wait-list control or treatment as usual	Effect of mellow parenting on child outcomes: Dersimonian-Laird random effects model	SMD = −0.40 (−0.77 to −0.02)	Critically low	—	3
		Effect of mellow parenting on child outcomes: fixed effects model	SMD = −0.40 (−0.77 to −0.02)		—	3
McGinn et al[60] (2020)	Traditional care case processing compared with no intervention or alternative treatment	Reunification of children with families or maintenance of in-home care	OR = 1.69 (1.03 to 2.78)	High	86 305	10
		Continued maltreatment, effects from nonrandomized studies	OR = 0.73 (0.48 to 1.11)		1779	5
		Continued maltreatment, effects from RCTs	OR = 1.29 (0.85 to 1.98)		1158	4
		Kinship placements	OR = 1.29 (0.94 to 1.76)		85 537	5
Leijten et al[45] (2016)	Transported or homegrown interventions compared with no-treatment, waitlist, minimal intervention, or care as usual.	Effectiveness between transported or homegrown interventions to reduce disruptive child behavior	MD = 0.10 (−0.08 to 0.29)	Moderate	374	129
		Effectiveness between transported or homegrown interventions to reduce disruptive child behavior: Incredible years program	MD = 0.12 (−0.15 to 0.40)		82	31
		Effectiveness between transported or homegrown interventions to reduce disruptive child behavior: triple P program	MD = 0.27 (−0.02 to 0.56)		113	39
		Effectiveness between transported or homegrown interventions to reduce disruptive child behavior: PCIT program	MD = 0.40 (−0.26 to 1.05)		51	11
		Effectiveness between transported or homegrown interventions to reduce disruptive child behavior: Parent Management Training (Oregon) program	MD = 0.39 (−0.93 to 1.70)		24	9
		Effectiveness between transported or homegrown interventions to reduce disruptive child behavior: US and Canada	MD = 0.19 (−0.60 to 0.98)		155	51
		Effectiveness between transported or homegrown interventions to reduce disruptive child behavior: Australia	MD = −0.19 (−0.63 to 0.26)		101	30

TABLE 6 Continued

Source	Comparison	Outcomes	Pooled Effect Estimates (95% CI)	AMSTAR Rating	Total # of People	Total # of Studies
		Effectiveness between transported or homegrown interventions to reduce disruptive child behavior: non-English speaking European countries (Continental Europe and Iceland)	MD = 0.38 (−0.11 to 0.86)		60	22
		Effectiveness between transported or homegrown interventions to reduce disruptive child behavior: English-speaking European countries (UK/Ireland)	MD = −0.07 (−0.42 to 0.28)		38	16
Sanders et al[48] (2014)	Multilevel triple P-positive pParenting program system compared with nonactive control group (ie, a waitlist control group or usual care)	Child SEB outcomes: all levels combined	SMD = 0.525 (0.358 to 0.692)	Low	—	56
		Parenting practices: all levels combined	SMD = 0.498 (0.362 to 0.634)		—	48
		Parenting satisfaction and efficacy: all levels combined	SMD = 0.551 (0.372 to 0.730)		—	41
		Parental adjustment: all levels combined	SMD = 0.481 (0.321 to 0.641)		—	45
		Parental relationship: all levels combined	SMD = 0.230 (0.136 to 0.325)		—	37
		Child observation: all levels combined	SMD = 0.400 (0.070 to 0.730)		—	13
		Parent observation: all levels combined	SMD = 0.249 (0.031 to 0.467)		—	11
Valentine et al[50] (2019)	Effects of families and schools together (FAST), relative to waiting list, usual or alternative services, or no intervention.	Child school performance	SMD = −0.02 (−0.11 to 0.08)	High	6276	4
		Child internalizing behavior: long-term follow-up, parent report	SMD = 0.03 (−0.11 to 0.17)		908	4
		Child internalizing behavior: long-term follow-up, teacher report	SMD = −0.06 (−0.19 to 0.07)		912	4
		Child externalizing behavior: long-term follow-up, parent report	SMD = −0.19 (−0.32 to −0.05)		754	4
		Child externalizing behavior: long-term follow-up, teacher report	SMD = −0.10 (−0.24 to 0.04)		912	4
		Child school attendance	SMD = 0.03 (−0.10 to 0.16)		1450	2
		Parental engagement with education	SMD = 0.03 (−0.07 to 0.12)		1232	2
		Family relationships	SMD = 0.08 (−0.03 to 0.19)		2569	4

TABLE 6 Continued

Source	Comparison	Outcomes	Pooled Effect Estimates (95% CI)	AMSTAR Rating	Total # of People	Total # of Studies
Vlahovicova et al[51] (2017)	Manualized interventions against treatment as usual	Risk of re-abuse	RD = −0.11 (−0.22 to −0.004)	Low	—	4
		Risk of re-abuse: sensitivity analysis	RR = 0.76 (0.54 to 1.07)		—	4
Zief et al[37] (2006)	After-school programs compared with no intervention	Self-care	SMD = 0.503 (0.097 to 0.910)	Critically low	101	3
		Athletic activities	RD = 0.073 (0.02 to 0.144)		661	2
		Art/music/drama dance activities	RD = 0.083 (0.01 to −0.153)		661	2
		School attendance	SMD = −0.001 (−0.125 to 0.122)		1072	2
		Television viewing	SMD = −0.066 (−0.1224 to 0.091)		661	2
		Reading scores	SMD = 0.028 (−0.101 to 0.157)		983	2
		Grade point average (GPA)	SMD = 0.083 (−0.032 to 0.199)		1004	5
Mixed setting interventions Burkey et al[40] (2018)	No treatment, wait list controls, treatment as usual, groups or inactive controls.	Child behavior problems (all interventions)	SMD = −0.38 (−0.51 to −0.24)	High	4441	24
		Child behavior problems, child-focused interventions	SMD = −0.39 (−0.62 to −0.16)		—	13
		Child behavior problems, parent-focused interventions	SMD = −0.43 (−0.66 to −0.20)		—	8
		Child behavior problems, classroom based	SMD = −0.49 (−0.71 to −0.28)		—	2
		Child behavior problems, multicomponent interventions	SMD = −0.19 (−0.50 to 0.12)		—	3
		Child behavior problems, children aged 0–5	SMD = −0.36 (−0.66 to −0.06)		—	4
		Child behavior problems, children aged 6–12	SMD = −0.42 (−0.65 to −0.19)		—	11
		Child behavior problems, children aged 13–18	SMD = −0.43 (−0.76 to −0.10)		—	6
		Child behavior problems, prevention focused	SMD = −0.25 (−0.41 to −0.09)		—	11
		Child behavior problems, treatment focused	SMD = −0.56 (−0.51 to −0.24)		—	11
		Child behavior problems, specialist delivered	SMD = −0.58 (−0.75 to −0.43)		—	12
		Child behavior problems, nonspecialist delivered	SMD = −0.15 (−0.27 to −0.03)		—	11
Durlak and Taylor[22] (2007)	Positive youth development (PYD) programs compared with control groups	Systemic change efforts at psychosocial environment: classroom	Post: ES = 0.47; Follow-up: ES = 0.42	Critically low	—	Post: 10; Follow-up: 1
		Systemic change efforts at psychosocial environment: school-wide	Post: ES = 0.74; Follow-up: —		—	Post: 8; Follow-up: 0
		Systemic change efforts at classroom level	Post: ES = 0.78; Follow-up: —		—	Post: 4; Follow-up: 0

TABLE 6 Continued

Source	Comparison	Outcomes	Pooled Effect Estimates (95% CI)	AMSTAR Rating	Total # of People	Total # of Studies
		Parenting practices	Post: ES = 0.41; Follow-up: ES = 0.49		—	Post: 33; Follow-up: 17
		Family environment	Post: ES = 0.34; Follow-up: ES = 0.94		—	Post: 25; Follow-up: 3
		Bonding to community adults	Post: ES = −0.26; Follow-up: —		—	Post: 2; Follow-up: 0
		Family-school relationships	Post: ES = 0.49; Follow-up: ES = −0.09		—	Post: 6; Follow-up: 1
Morton and Montgomery[31] (2011)	Youth empowerment programs (YEPs) compared with no intervention, waitlist, and alternative intervention	General self-efficacy	SMD = 0.19 (-0.12 to 0.49)	High	167	2
Ulferts et al[33] (2019)	Initiatives aimed at enhancing the quality of early childhood education	Global process quality on children's outcomes (language/ literacy and mathematics)	ES = 0.11 (0.04 to 0.18)	Low	—	13
		Domain-specific process quality on children's outcomes (language/ literacy and mathematics)	ES = 0.10 (0.05 to 0.15)		—	11

—, not reported.

interventions ($n = 29$) have been summarized in Supplemental Information. Of the included studies, 39.7% had critically low-quality ratings, 26.9% were low, 25.6% were high, and 7.8% were moderate. Evidence from universal prevention interventions showed overall positive effects on youth development and prevention of poor mental health outcomes, where most interventions were school-based. Antibullying interventions reduced bullying and victimization where the majority were school-based, with limited evidence for digital interventions. Community- and school-based interventions were found to prevent substance abuse; however, the evidence for digital interventions was limited. Only 2 reviews examined interventions for the prevention of self-harm and found evidence for gatekeeper training and school-based interventions. School- and community-based interventions had positive effects on children and adolescents' early learning and positive development. Lastly, there was mixed evidence overall for the effectiveness of home-based interventions to enhance responsive caregiving and child safety.

Evidence for key impacts on the greatest causes of mental illness burden in the school-age group suggest that school-based multicomponent PP[158] and universal prevention interventions[116,132] were effective in reducing depression and anxiety in predominantly HIC. Furthermore, universal, resilience-focused interventions[118] were found to be effective in reducing depression and externalizing symptoms in HIC. School-based mental health promotion interventions[108] and interventions describing modules of mental health[126] were effective in reducing depression and anxiety in LMIC. Furthermore, peer outreach,

TABLE 7 Key Effects of Interventions on Depression, Anxiety, and Externalizing Symptoms/Behaviors

Delivery platform	Depression	Anxiety	Externalizing symptoms/behaviors
School-Based	• Universal CBT interventions[a112] 　o SMD = −0.13 (−0.44 to 0.17) • Universal resilience-focused interventions[a118] 　o SMD = **−0.08 (−0.14 to −0.01)** • Multicomponent positive psychology interventionsd[d158] 　o ES = **0.28 (0.13 to 0.43)** • School based Penn Resiliency Program[d17] 　o MD = −0.23 (−1.09 to 0.62) • Universal screening programs[d106] 　o detection of depression (n = 3) • Mental health promotion interventions[e108] 　o depression (n = 14) • Early intervention programs for depression[c113] 　o depressive symptoms (n = 42) • School based, universal prevention interventions[a] 　o depression scores in the intervention group compared with control (n = 24) 　o ↓ depression at postprogram and long-term follow-up periods, but not at short-term follow-up (n = 14)[132] • Interventions describing modules of mental health programs[e112] 　o depression (n = 11) • Peer outreach, counseling, and education interventions[e147] 　o depression, improvements were found for depressive symptoms (n = 7) • Physical activity interventions[c156] 　o depression, improvements were found for measures of depression symptoms (n = 5)	• Universal CBT interventions[a112] 　o SMD= −0.07 (−0.23 to 0.05)[b] • Universal mindfulness and relaxation-based interventions[a112] 　o SMD = **−0.65 (−1.14 to −0.19)** • Universal resilience-focused interventions[a118] 　o SMD = −0.14 (−0.28 to 0.00) • Multicomponent positive psychology interventions[d158] 　o ES = **0.14 (0.04 to 0.24)** • School based Penn Resiliency Program[d17] 　o SMD = 0.13 (0.00 to 0.26) • School based pull-out programs on aggressive behavior 　o Random effects mean (REM) = **0.21, P < .01**[d34] 　o REM = **0.26, P < .01**[a35] • Universal screening programs[d] 　o detection of anxiety (n = 3)[106] • Mental health promotion interventions[e108] 　o reduced anxiety (n = 14) • School based, universal prevention interventions[a] 　o ↓ anxiety scores in the intervention group compared with control (n = 24)[116] • Interventions describing modules of mental health programs[e126] 　o anxiety (n = 11)	• Universal resilience-focused interventions[a118] 　o SMD = **−0.18 (−0.34 to −0.01)** • Teacher delivered psychosocial interventions[c125] 　o G = 0.015 (−0.037 to 0.066) • Universal school-based interventions[c149] 　o ES = **0.50 (0.35 to 0.63)** • Self-regulation interventions[d160] 　o ES = 0.01 (−0.38 to 0.39) • Group-based mindfulness interventions[a27] 　o G = **0.145 (0.032 to 0.258)**
Community-Based	• Evidence based youth mental and behavioral health disorder preventive interventions[d146] 　o depression, significant improvements were found for depression compared with comparison conditions (n = 5) • Developmental group therapy[c63] 　o MD = −0.93 (−4.03 to 2.17) ¶		• Parenting interventions based on behavioral/ social learning theory[a] 　o MD = 0.10 (−0.08 to 0.29)[45] • Families and schools together (FAST) program 　o SMD = **−0.19 (−0.32to −0.05)**[50]
Digital-Based	• Universal psychosocial interventions[a154] 　o ES = −0.054 (−0.181 to 0.074)	• Universal psychosocial interventions[a154] 　o ES = −0.054 (−0.181 to 0.074)	d

TABLE 7 Continued

Delivery platform	Depression	Anxiety	Externalizing symptoms/behaviors

Mixed Settings	• Computerized CBT[d115]
	  o depressive symptoms (n = 7)
	• Digital health interventions[c131]
	  o depression outcomes (n = 12)
	• Mindfulness based interventions[c119]
	  o **d = 0.27 (0.06 to 0.49)**
	• CBT & interpersonal therapy interventions[a129]
	  o SMD = *−0.21 (−0.27 to −0.15)*
		• Computerized CBT[d115]
		  o anxiety symptoms (n = 7)
		• Digital health interventions[c131]
		  o anxiety (n = 12)
		• Prevention interventions for any DSM-5 anxiety disorder[d110]
		  o **SMD = 0.22 (0.14 to 0.29)**
		• Mindfulness based interventions[c119]
		  o **d = 0.16 (0.04 to 0.27)**
		• Cognitive-behavioral or behavioral interventions[a159]
		  o **SMD = −0.81 (−1.00 to −0.63)**
			• Physical activity interventions[c]
			  o **MD = 0.32 (0.023 to 0.616)**[156]
			• Psychosocial interventions[a]
			  o SMD = *−0.38 (−0.51 to −0.24)*[40]

Bolded indicates significant; italicized indicates t= nonsignificant.

a HIC and LMIC.

b Significance not reported.

c Country context not reported.

d HIC context.

e LMIC.

counseling, and education interventions were effective in reducing depression in LMIC.[147]

In community-based settings, evidence-based youth mental and behavioral health disorder prevention interventions[146] were effective in reducing depression, and the FAST program[50] was effective in reducing externalizing symptoms in HIC. Computerized CBT and digital health interventions were effective in reducing depression and anxiety[115,131] in HIC. Mindfulness-based interventions[119] delivered through mixed settings were effective in reducing depression and anxiety in LMIC and HIC.

When discussing evidence specifically from LMIC, school-based PYD programs provided the strongest evidence for positive development (eg, reduced risky sexual behavior, substance use, and interpersonal violence) and mental health outcomes (eg, increased emotional stability and self-esteem) in children; however, more research is urgently required to identify effective preventive interventions for children exposed to a range of adversities and types of mental disorders in the LMIC context.

Limitations

Our overview of reviews was primarily limited by our inability to synthesize and interpret research findings from the included systematic reviews because of inadequate or varied reporting of pooled data from the primary studies.

Implications for Research

Despite the breadth of reviews found, there remain several significant gaps in the literature. Firstly, there were a limited number of studies focused on low education, low-income, and conflict-struck settings. Some outcome measures (eg, child abuse and neglect) may be

more prevalent and underreported in these contexts.[178] Furthermore, there were a paucity of studies conducted across all delivery strategies. In particular, digital interventions were understudied compared with school-based interventions which were most often discussed across all domains. Given there are many school-aged children who never attend school, there is a need for interventions conducted outside of the school setting to improve coverage to all school-aged children. Only 2 studies were captured in the self-harm domain, highlighting the need for more research focused on self-harm prevention. Lastly, many of the included reviews captured children into adolescence (eg, from 0 to 18 years old). There is need for more research targeting younger children (<10 years) given that intervening at an early age is critical to prevent mental illness in adolescence and adulthood.

Implications for Policy

Given the identified gaps in the literature and methodological and clinical heterogeneity of included reviews, we are limited in our ability to make definitive statements about effectiveness of interventions, rendering policy interpretation and implementation challenging. However, there were some common recommendations that emerged from the literature. First, a common recommendation across several domains is to implement multicomponent and multilevel interventions.[41,48,78,90,112,158] Several reviews suggest adding school-based components to comprehensive antibullying interventions[78,90] and integrating home-level responsive parenting interventions into child survival programs.[41,48] Furthermore, groups involved in intervention implementation, such as school health personnel, should be involved in intervention development and supported during implementation.[78] Several reviews also recommend training these groups for effective intervention programming.[41,65,78] Finally, given most universal prevention interventions were delivered in schools, there is evidence for the use of school-based universal prevention programs.

Key Messages

- Positive youth development and after-school programs had encouraging effects on academic achievements and problematic behaviors, including substance use and risky sexual activity, and/or more distal developmental outcomes, such as employment and health indicators. Interventions targeting positive development showed improvements at different contextual levels including school, homes, and community settings.
- School-based antibullying interventions reduced bullying perpetration and victimization outcomes.
- Community- and school-based interventions prevented substance use initiation.
- A limited number of reviews addressed self-harm prevention. Evidence suggests that gatekeeper training improves suicide literacy outcomes in gatekeepers, and school-based interventions prevent suicidal ideation and attempts in youth.
- Responsive caregiving and parenting programs supported nurturing care through improvements in children's social, emotional, and behavioral outcomes.
- The largest number of included studies had consistent findings that showed positive effects from universal prevention interventions on a large range of mental health outcomes.
- Overall, more research is required in LMIC contexts that focuses on digital interventions, interventions provided outside of the school context, prevention of self-harm, and especially interventions targeting young children (aged <10 years).

CONCLUSIONS

High levels of statistical heterogeneity and diversity of study design, instruments, populations, interventions, and settings were common. This limited our ability to make comparisons and definitive statements about effectiveness of interventions, rendering policy interpretation and implementation challenging. Overall, this overview of reviews highlights the need for further research to consolidate findings and understand the specific criteria involved in creating positive mental health and development outcomes from the various interventions considered. Furthermore, there is urgent need for more research specifically in the LMIC context to improve coverage and extend findings to all SACA.

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ABBREVIATIONS

CBT: cognitive behavioral therapy
CI: confidence interval
ES: effect size
HIC: high-income countries
LMIC: low- and middle-income countries
ME: mean effect
OR: odds ratio
PP: positive psychology
PYD: positive youth development
SACA: school-aged children and adolescents
SMD: standardized mean difference
SEL: social–emotional learning

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