

Australian School Based Interventions Addressing Child and Adolescent Mental Disorders: A Systematic Review

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Abstract

Aim: Prevalence of mental disorders in children and adolescents is between 3% to 30% worldwide. Since countries differ in geopolitical contexts, the World Health Organization (WHO) called for a coordinated effort to report on local contexts. We aim to address this gap by providing a review of effectiveness of Australian school-based mental health interventions and identifying success factors for school-based implementation.

Method: Articles published about Australian schools between 2010–2022 were reviewed using the following databases: A+ Education, Bibliomap, Cochrane Central Register of Controlled Trials, DoPHER, Embase, Epistemonikos, ERIC, MEDLINE, PsycINFO, PubMed, Scopus, and TRoPHI EPPI. Of the 8,101 articles selected, 32 met inclusion criteria and included n = 27,471 participants.

Results: Eighteen percent of the total number of participants in school-based interventions reported small to medium results and 2% reported a high intervention effect with short-term results. Four possible success factors emerged: first, multidisciplinary care with family, government agencies, and local community organizations. Second, cognitive behavioral therapy (CBT), however, there were mixed results indicating that more research is needed focusing on specific areas, such as gamified CBT-online for youth. The third success factor was social and emotional learning, and the fourth included a range of emerging therapies, such as mindfulness, animal therapy, music and nature walks.

Conclusion: Our results show that the mental health of Australian children and adolescents needs urgent attention by way of improved program rigor and establishing a systematic evidence base of best practice. With increased numbers of children and adolescents presenting with mental disorders in schools, our research indicates the need for delivering high-quality programs in partnership with external healthcare agencies and improving school capacity for triage, early detection, and intervention.

Keywords: Mental health, Programs, Effectiveness, Quality, School, Australia

Introduction

In a 2024 global prevalence study, the mean rates of mental health disorder in 5-24 year olds was estimated to be 11.63% [1], but estimates vary between countries from 3% to 30% [2]. To better understand the global burden of disease from mental illness, the World Health Organization (WHO) called for a coordinated global effort to report on local contexts [2,3]. A responsive systematic review of the Australian context has yet to be undertaken. The purpose of this review is to address this gap.

Countries differ in their investment in both mental health funding and school funding. In 2020, the Australian Productivity Commission estimated that mental health illness will cost Australia \$220 billion each year [4]. Fifty percent of adult mental health issues are present during childhood while young people are in school. Poor mental health is highly correlated with poor educational outcomes in young people and can result in their not being in employment, education, or training (NEET) [5]. Schools can support students through prevention and early intervention; however, educationalists and healthcare workers need to know what works and what doesn't. As Scott and colleagues argued, "providing more of what does not work, with a lack of coordinated action makes no sense clinically, socially or economically" [6].

Moderator analyses of school-based mental health programs showed improved outcomes for studies with cognitive behavioral therapy (CBT) [7] and mindfulness [8]. Bastounis and colleagues reported moderator effects for programs that targeted externalizing problems, were integrated into students' academic instruction, and were implemented multiple times a week [9]. Systematic reviews of mental disorders may be categorized in terms of specific disorders. Most programs showed the effect of school-based interventions on depression and anxiety due to the high prevalence rates of these disorders [10]. The effects tended to be small [11] with meta-analysis showing that targeted programs had higher effect sizes for depression prevention [12-14]. Results were mixed because a

similar review of programs for depression and anxiety found that more than 50% of universal and targeted programs had positive effects on anxiety, but little significant effect on depression [15]. Another review found that despite the post-intervention effect for universal prevention, the measured positive effects of targeted programs were short-term [16].

Reviews related to behavioral problems reported small to large effects [17,18]. Behavior-related reviews focused on ADHD [19-21] and autism spectrum disorder [22] reported mixed results for effectiveness. Small effects were reported on interventions that were related to behaviors and suicidal thoughts [23]. Overall, Berger and colleagues argued that the effectiveness of many Australian programs has not been established [24].

One reason for the mixed results for the effectiveness of school-based mental health programs may be the geopolitical context of where the interventions occurred. Such contexts vary based on government funding for population mental health, funding for schools and school-mental health, and teacher-training. Therefore, the WHO called for a coordinated effort to report on local country contexts. The present systematic review is a response to the call by the WHO for research on the effectiveness of school based mental health programs in each country in the absence of a current and rigorous systematic review of the Australian context. Our focus included the COVID-19 and pre-COVID-19 period from 2010-2022. During this time, all research was banned in schools due to school closures. Although school-closures no longer occur due to COVID-19 conditions, researchers in Australia are still only allowed restricted access to schools due to the burden it places on schools and teachers' time.

Method

Search strategy

The search strategy for the database searches is given in (Table 1).

Keyword	Search String
Mental health	"mental health" OR "mental-health" OR "mental illness" OR "mental-illness" OR "mental disorder" OR "mental-disorder" OR "mental health problem" OR "mental-health problem" OR "mental health problem" OR "mental-health issue" OR "mental health issue"
Clinical diagnosis	"psychiatr*" OR "psycholog*" OR "psychosocial" OR "disorder"
Target group	"child*" OR "adolescen*" OR "school age*" OR "school-age*" OR "schoolchild*" OR "school child*" OR "school-child*" OR "youth" OR "young person" OR "student*" OR "pupil*"
Context	"school*" OR "school-based" OR "school based" OR "classroom*"
Country	Australia
Filters	English, Humans, from 1 January 2012 to 1 January 2022

The protocol was registered on PROSPERO (CRD42022312232) through the National Institute for Health Research (Figure 1).

This review used ten databases: (A+Education, Bibliomap, Embase, Epistemonikos, ERIC, MEDLINE, PsycINFO, PubMed, Scopus, TRoPHI EPPi), Register of trials (Cochrane Central Register of Controlled Trials), and an additional four databases

for cross-referencing (Campbell Systematic Reviews, Dissertations and Theses, and DoPHER Database of Promoting Health Effectiveness Reviews, and Conference Proceedings). Further searches were cross-reference searches conducted on www.google.com, www.scirus.com, and www.altavista.com (accessed on 2 January 2023) which did not yield any new results.

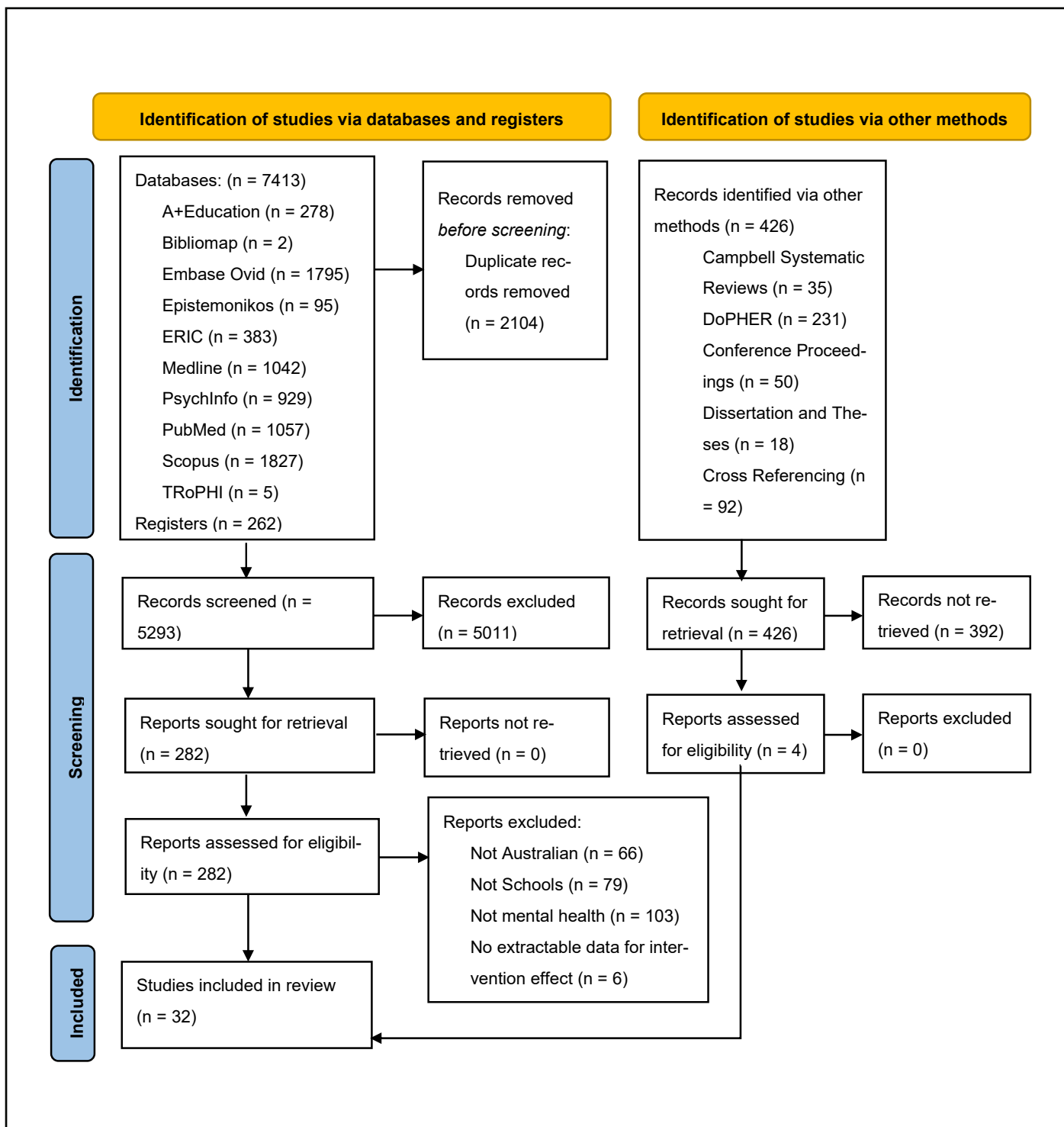


Figure 1. PRISMA diagram from: Page et al. 2021 [25]. For more information, visit: <http://www.prisma-statement.org/>

Eligibility criteria

Articles eligible for inclusion were Australian school-based mental health interventions (2012-2022) and included the following areas: Social phobia, separation anxiety disorder, generalized anxiety disorder, obsessive-compulsive disorder, major depressive disorder, attention-deficit/hyperactivity (ADHD) disorder, and conduct disorder [26,27].

Studies were included that provided an effect for time and condition on pre- and post-intervention and pre- and post-control either active, placebo, or waitlisted. Studies were included if they provided effect sizes or if sufficient data were available to calculate effect size and measurements were made using validated instruments [28]. The review trawl excluded articles without empirical data, letters, commentaries, memorandums, and opinion pieces, or doctoral theses.

Data extraction and analysis

Data extraction was carried out using the PICOS method [29]. The PICOS (population, phenomena of Interest, Comparators, Outcomes, Study design) was used to determine the inclusion and exclusion criteria similar to Bastounis and colleagues [9]. The Population is students aged 8–18; Phenomena of Interest: effectiveness and study quality of school-based interventions; Comparators: all comparators; Outcomes: childhood and adolescent mental disorders; Study design: interventions RCTs and non-RCT that included an evaluation process reporting study impact (statistically significant effect).

Data were extracted by two reviewers (HG, AV) who conducted double-blinded reviews based on title and abstract search, which was followed by full-text analysis. Inter-coder reliability between the two researchers was calculated as 90% and a third reviewer (RW) was used in the event of disagreement. All records were collated in excel format.

Once articles were chosen, the following information was extracted and tabled in excel format: Authors; program name; design (RCT CRCT, quasi-experimental design; non-randomized); age of participants; sample size; exposure; follow-up duration or not; intervention delivery personnel; and study quality (risk of bias). Because of the high heterogeneity of experimental designs and mental domains, meta-analyses and sensitivity analysis to identify outlier results were not able to be conducted.

Risk of bias

Study quality and risk of bias were conducted using the 'Effective Public Health Practice Project' (EPHPP) quality assessment tool [30]. This tool was chosen because of its use in previous Australian research assessing the quality of school-based mental health programs where both randomized and non-randomized trials were included for systematic review

[15,31,32]. Assessment criteria included: selection bias, study design, confounding, blinding, data collection, and study attrition. Each article was independently assessed for quality by two reviewers (HG, AV). If a consensus was not reached, the decision was deferred to the third author (RW).

Effect size

Effect size was sought for statistically significant effects for time and condition on pre- and post-intervention measures under controlled conditions. Where data were available and extractable, effect size was calculated for Cohen's *d* using the difference between estimated means of the two conditions (intervention and control over time) divided by the baseline standard deviation of raw scores [33]. If Cohen's *d* was not able to be calculated with the data provided (including supplementary material), then effect size was reported verbatim as reported by authors in their published article.

Results

Out of 8,101 records, 32 ($N = 32$) met inclusion criteria (**Table 2**).

Study characteristics

The total sample size of included studies was $n = 21,330$ participants. Sample size varied from 24 participants [58] to 6,386 [61]. Ten interventions ($N = 10$, $n = 12\%$ of total number of participants) were (RCTs), 14 ($n = 65\%$) were CRCTs, and six ($n = 22\%$) had quasi-experimental designs. There was one non-randomized study and one quasi-RCT with both having a sample size less than 1%. Students' age ranged from 5 to 18 years, school K–12, from both metropolitan and rural schools providing a representative sample of the national population. The exposure varied from 5 weeks [44] to three years [60].

Study quality

Out of 32 interventions that measured mental health outcomes, 9 interventions comprising 13% of the total sample size had high study quality scores. A significant small effect was reported on anxiety from a sleep intervention [35]. All other interventions that scored a high quality-score reported no intervention effect on mental health measures.

The majority ($N = 12$, $n = 78\%$ sample size) of interventions had a medium quality score. Only one study out of the studies with a medium quality score reported a large effect, which was on PTSD measures from group CBT [54]. Five interventions with a medium quality score reported a medium effect on mental health outcomes, and three reported a small effect.

Eleven interventions ($n = 9\%$ sample size) had low study quality scores. One of these interventions reported a large effect on dysphoria using acceptance and commitment therapy [47], and another reported a medium effect on

Table 2. Participant characteristics (N = 32) in alphabetical order.

Authors	Program (Design)	Age (Sample Size)	Exposure (Follow-up)	Delivery	Study Quality
Afsharnejad et al. (2022) [34]	Certified KONTAKT® trainers (RCT)	12–17 yrs (90)	16 x 90 min sessions (3 mnths follow-up)	Trainers and clinicians	High
Blake et al. (2016) [35]	Sleep-SENSE (RCT)	12–17 yrs (144)	90 mins/wk for 7 wks (18–24 mnths)	Qualified and student clinical psychologists	High
Burckhardt et al. (2015) [36]	Bite Back (RCT)	13–17 yrs (336)	6 classes for 4–6 wks (No follow-up)	Online delivery teacher (trained)	Medium
Burckhardt et al. (2016) [37]	Strong Minds (RCT)	15–18 yrs (267)	16 x 30 mins twice a wk over 12 wks (No follow-up)	Researcher (psychologist)	Medium
Burckhardt et al. (2017) [38]	Acceptance and Commitment Therapy (Quasi-RCT)	14–16 yrs (48)	25 min/wk for 7 wks (5 mnths follow-up)	Teacher and Program staff (Psychologist)	Low
Calcar et al. (2016) [39]	e-couch Anxiety and Worry (CRCT)	12–18 yrs (1767)	40 mins/wk for 6 wks (6 mnths follow-up)	Online assisted by school staff	Medium
Dray et al. (2017) [40]	Pragmatic school-based intervention (CRCT)	12–16 yrs (2149)	16 Strategies of varying length (No follow-up)	School based delivery	Medium
Gold (2017) [41]	Group Music Therapy (CRCT)	12–14 yrs (89)	1/wk for 8 wks. Uneven exposure (No follow-up)	Music therapist	Medium
Havighurst et al. (2015) [42]	Emotion focused early intervention (RCT)	5–9 yrs (204)	Whole class and one to one delivery (40 wks follow-up)	Teacher (trained) delivery	Low
Hetrick et al. (2017) [43]	Reframe-IT (RCT)	13–19 yrs (50)	8 lessons over 10 wks (5.5 mnths follow-up)	Project staff (healthcare professional)	High
Hitchcock et al. (2017) [44]	Cogmed Working Memory Training (CRCT)	10–13 yrs (148)	45 mins/day for 5 wks (3 mnths follow-up)	Teacher delivered	High
Johnson et al. (2016) [45]	Dot be Mindfulness Program (CRCT)	13–18 yrs (308)	35–60 mins/wk for 8 wks (3 mnths follow-up)	External facilitator	Low
Johnstone et al. (2020) [46]	Emotion regulation (ERP) and behavioral activation (BAP) programs (CRCT)	8–13 yrs (295)	50 min/wk for 8 wks (6 and 12 mnths follow-up)	Project staff (Psychologist)	High
Livheim et al. (2015) [47]	ACT (RCT)	8–18 yrs (66)	8 wks manualized program (No follow-up)	Psychologist	Low
Lowe and Wuthrich (2021) [48]	Study Without Stress (RCT)	17–18 yrs (40)	1 hr/wk for 8 wks (3 mnths follow-up)	Psychologist and trained teacher	High
McLoone and Rapee (2012) [49]	Cool Kids (CRCT)	7–10 yrs (152)	1 hr/wk for 10 wks (1yr follow-up)	School psychologist	Medium

Nathan et al. (2013) [50]	Football United (Quasi-experimental)	13–17 yrs (142)	Uneven exposure for 10 wks (No follow-up)	Student coaches and school staff	Low
Nehmy et al. (2015) [51]	Healthy Minds (Quasi-experimental)	11–18 yrs (688)	Uneven dose over 8 wks (6, 12 mnths follow-up)	Psychologist and student psychologist	High
O’Haire et al. (2014) [52]	Animal Assisted Activities (CRCT)	5–12 yrs (64)	16 x 20 min sessions + exposure to animals 8 wks (No follow-up)	Researcher without clinical background	Medium
Olive et al. (2019) [53]	LOOK Physical Education Program	8 yrs (642)	2 x 50 min/wk for over 4 yr period (follow-up 12 mnth and 4 yrs)	Teachers (Physical Education)	Medium
Ooi et al. (2016) [54]	Teaching Recovery Technique (CRCT)	10–17 yrs (82)	8 wks (3 mnths follow-up)	Project staff (Psychology students and researcher)	Medium
Perry et al. (2017) [55]	SPARX-R (CRCT)	16–17 yrs (540)	30 mins/wk for 7 wks (18 mnths follow-up)	Online assisted by school staff	Low
Quinlan et al. (2014) [56]	Home of Expressive Arts in Learning (Quasi-experimental)	13–15 yrs (42)	1 hr/wk for 10 wks (No follow-up)	Project staff (therapist)	Medium
Ratcliffe et al. (2014) [57]	Emotion-Based Social Skills Training (Quasi-experimental)	7–13 yrs (217)	(90 min/wk for 5 wks) x 3 (6 mnths follow-up)	School psychologist	Medium
Ritzi et al. (2016) [58]	Play Therapy (Quasi-experimental)	6–9 yrs (24)	Twice a day for 10 days (No follow-up)	Play therapy instructor	Low
Rooney et al. (2013) [59]	Aussie Optimism: Positive Thinking (RCT)	9–10 yrs (910)	60 mins/wk for 10 wks (6 mnths follow-up)	Project staff (Psychologist)	High
Spence et al. (2014) [60]	beyond blue: the national depression initiative (Quasi-experimental)	12–13 yrs (3630)	Exposure undefined (24 mnth follow-up)	Teacher delivered	Medium
Teeson et al. (2020) [61]	Climate Schools (CRCT)	13–14 yrs (6386)	40 mins/wk for 12 wks (12, 24, 30 mnths follow-up)	Teacher and online	Medium
Tomyn et al. (2016) [62]	Think Health and Wellbeing (Non-randomized)	13–17 yrs (194)	50 mins/wk for 6 wks (3 mnths follow-up)	Trained psychology students	Low
Wagner et al. (2020) [63]	Alert Program® intervention (CRCT)	5–12 yrs (271)	1 hr/wk for 8 wks (2-3 mnths follow-up)	Teacher (trained) delivery	Medium
Wong et al. (2016) [64]	School-based Internet CBT (CRCT)	14–16 yrs (976)	40 mins/wk for 7 wks (No follow-up)	Teacher delivered	Medium
Yap et al. (2018) [65]	Partners in Parenting Program (RCT)	12–15 yrs (359)	25 mins/wk for 9 wks + 1 phone call/wk for 7 wks (No follow-up)	Web-based interaction and telephone calls with a researcher	High

oppositional defiant disorder from child and parent based emotional and socialization therapy [42]. Out of the studies with low study quality scores, a small effect was reported on depression and anxiety and depressive symptoms [38,55,62]. These used child and parent based emotional and socialization therapy, positive education, and CBT, respectively.

Delivery mode

The majority of school-based interventions were delivered by school staff (N = 17, n = 83% of the total population) were delivered by the schoolteacher or school staff (with and without training). Within this group school psychologists delivered (N = 3, n = 2%). Qualified (or student) psychologists or researcher-psychologists delivered 9 interventions (N = 9, n = 12%). Three interventions were delivered by clinicians or

therapists trained in the specific field of the intervention, such as music or play therapy. It was unclear whether the allocation sequence was adequately generated in all studies unless it was reported to be an interrupted series.

Intervention effect and subgroup analysis

Seventeen of 32 studies (n = 33% of the total sample size) reported a statistically significant effect on one or more mental health outcomes. All studies measured multiple mental outcomes that are summarized in **Table 3** and graphed both in terms of the mental health areas (**Figure 2**), and in terms of effective interventions (**Figure 3**). **Table 3** headings are organized in terms of diagnostic chapters in the DSM-5 classification system.

Table 3. Statistically significant effect of intervention on mental health outcomes (studies with significant effect are in bold).				
Authors	Mental Health Area	Intervention	Statistically Significant Effect	Effect Size [#]
DEPRESSION				
McLoone and Rapee (2012) [49]	Depression	CBT	No significant effect	DASS-P $d = .24, p = .108$
Rooney (2013) [59]	Depression	CBT	No significant effect	CDI $d = .18, p < .001$
Hitchcock et al. (2017) [44]	Depression	CBT	No significant effect	CBCL c2 = 5.22 $p = .07$
Wong et al. (2016) [64]	Depression	CBT	Significant small effect	(K-6 $d = .13, p = .39$); (PHQ-9 $d = .14, p = .35$); (GAD-7 $d = .29, p = .05$)
Burckhardt et al. (2016) [37]	Depression	Positive psychology with ACT	Significant medium effect	DASS $d = .53, p = .04$; Composite depression/ anxiety symptoms (DASS $d = .57, p = .02$)
Spence et al. (2014) [60]	Depression	Supportive family environment	Significant small effect	CESD $d = 0.28, p = 0.004$
Yap et al. (2018) [65]	Depression	Parenting program	No significant effect	(SMFQ-P $d = .05, p = 0.566$); (SMFQ-C $d = .04, p = 0.609$)
Burckhardt et al. (2015) [36]	Depression	Positive psychology online	No significant effect	DASS-21 $F_{1,199.9} = .42, p = .52$
Tomyn et al. (2016) [62]	Depressive symptoms	CBT	Significant small effect	(SMFQ $d = .30, p = 0.020$)
Perry et al. (2017) [55]		Gamified CBT online	Significant small effect	MDI $d = 0.29, p < 0.001$
Burckhardt et al. (2017) [38]	Depressive disorder	Positive Education	Significant small effect	(DASS $d = .31, p = .79$); Tot DASS ($d = .44, p = .26$)
Livheim et al. (2015) [47]	Dysphoria	ACT	Significant large effect	RADS-2 $d = .77, p < .01$
Suicide-related behavior				
Hetrick et al. (2017) [43]	Anxiety (Suicide Related)	CBT online	No significant effect	MASC $d = .02, p$ not significant for all measures

Hetrick et al. (2017) [43]	Depressive symptoms (Suicide Related)	CBT online	No significant effect	(CDRS-R $d = .01$); (RADS-2 $d = .03$), p reported as not significant for all measures
Hetrick et al. (2017) [43]	Suicidal ideation	CBT online	No significant effect	SIQ $d < .01$, p not significant for all measures
ANXIETY				
McLoone and Rapee (2012) [49]	Anxiety	CBT	Significant medium effect	(SCAS-C $d = .26$, $p = .078$); (SCAS-P $d = .23$, $p = .135$); (AIQ-P $d = .03$, $p = .971$); (SAS-T $d = .26$, $p = .786$)
Rooney (2013) [59]	Anxiety	CBT	No significant effect	SCAS $d = .3$, $p < .001$
Hitchcock et al. (2017) [44]	Anxiety	CBT	No significant effect	CBCL c2 = .98 $p = .61$
Wong et al. (2016) [64]	Anxiety	CBT	No significant effect	(K-6 $d = .2$ $p = .75$); (PHQ-9 $d = .05$ $p = .75$); (GAD-7 $d = .18$ $p = .25$)
Burckhardt et al. (2017) [38]	Anxiety	Positive Education	Significant small effect	DASS $d = .28$, $p = .19$
Spence et al. (2014) [60]	Anxiety	Supportive family environment	Significant small effect	CESD $d = -0.41$, $p < 0.001$
Burckhardt et al. (2015) [36]	Anxiety	Positive psychology online	No significant effect	DASS-21 Not given but reported as not significant
Burckhardt et al. (2016) [37]	Anxiety	Positive psychology with ACT	No significant effect	Anxiety (DASS $d = .01$, $p = .35$); Composite depression/anxiety (DASS $d = .57$, $p = .02$)
Yap et al. (2018) [65]	Anxiety	Parenting program	No significant effect	(SCAS-P $d = .04$, $p = 0.09$); (SCAS-C $d = .09$, $p = 0.025$)
Calear et al. (2016) [39]	Generalized anxiety	CBT and psychoeducation	No significant effect	(GAD-7 $d = .07$, $p = .003$); (SCAS $d = .07$, $p = .52$)
Perry et al. (2017) [55]	Generalized anxiety	Gamified online CBT	No significant effect	SCAS-GAD $d = 0.06$ $p < 0.001$
Gold (2017) [41]	Internalizing problems	Music therapy	No significant effect	ICC = 0.09
Dray et al. (2017) [40]	Internalizing problems	Emotion regulation and behavioral activation	No significant effect	SDQ $d = .04$, $p = .87$
Hitchcock et al. (2017) [44]	Internalizing problems	CBT	No significant effect	CBCL c2 = 2.99 $p = .22$
Perry et al. (2017) [55]	Social anxiety	Gamified online CBT	No significant effect	SCASS-SA $d = 0.03$ $p < 0.001$
STRESS				
Burckhardt et al. (2015) [36]	Stress	Positive psychology online	No significant effect	DASS-21 Not given but reported as not significant
Burckhardt et al. (2016) [37]	Stress	Positive psychology with ACT	Significant medium effect	DASS $d = .74$, $p = .006$
Olive et al. (2019) [53]	Stress	Physical education	No significant effect	CSQ $d = .19$, $p > .010$
Lowe and Wuthrich (2021) [48]	Stress	CBT	No significant effect	Stress (DASS $d = 1.06$, $p = .002$)
Ooi et al. (2016) [54]	Internalizing behavior (Stress-related)	Group CBT	Significant medium effect	HSCL-37-A $\eta^2 = .10$, $p < .001$
Olive et al. (2019) [53]	Depression (Stress-related)	Physical education	No significant effect	CDI $d = .19$, $p > .010$

WORRY				
Johnstone et al. (2020) [46]	Worry	Emotion regulation and behavioral activation	No significant effect	PSWC-C $F(4, 128.54) = 1.14, p = .34$
Johnstone et al. (2020) [46]	Anxiety (Worry-related)	Emotion regulation and behavioral activation	No significant effect	RCDAS $F(4, 111.68) = .92, p = .45$
Johnstone et al. (2020) [46]	Depression (Worry-related)	Emotion regulation and behavioral activation	No significant effect	RCDAS $F(4, 111.68) = .92, p = .45$
Calear et al. (2016) [39]	Anxiety sensitivity (Worry-related)	CBT and psychoeducation	No significant effect	CASI $d = .04, p = .65$
Calear et al. (2016) [39]	Depressive symptoms (Worry-related)	CBT and psychoeducation	No significant effect	CES-D $d = .04, p = .20$
TRAUMA- AND STRESSOR-RELATED DISORDER				
Ooi et al. (2016) [54]	PTSD	Group CBT	Significant large effect	CRIES-13 $\eta^2 = .14, p = 0.006$
Ooi et al. (2016) [54]	Depression (PTSD)	Group CBT	Significant medium effect	DSRS $\eta^2 = .11, p = 0.024$
Ooi et al. (2016) [54]	Externalizing behavior (PTSD)	Group CBT	No significant effect	HSCL-37-A $\eta^2 = .00, p = .001$
Quinlan et al. (2014) [56]	Anxiety (Refugee background)	Arts psychotherapy	No significant effect	HSCL $d = .17, p = .60$
Quinlan et al. (2014) [56]	Depression (Refugee background)	Arts psychotherapy	No significant effect	HSCL $d = .1, p = .75$
Quinlan et al. (2014) [56]	Hyperactivity (Refugee background)	Arts psychotherapy	No significant effect	SDQ-T $d = .52, p = .11$
Quinlan et al. (2014) [56]	Conduct problems (Refugee background)	Arts psychotherapy	No significant effect	SDQ-T $d = .07, p = .82$
SOMATIC SYMPTOMS AND RELATED DISORDERS				
Livheim et al. (2015) [47]	Somatic symptom disorder	ACT	No significant effect	RADS-2 $d = .50, p = .113$
	Negative Affect	ACT	No significant effect	RADS-2 $d = .89, p = 0.006$
Hitchcock et al. (2017) [44]	Somatic complaints	CBT	No significant effect	CBCL $d = 2.84, p = .24$
Nehmy et al. (2015) [51]	Unhelpful perfectionism	CBT	No significant effect	DAS $d = .06, p = .010$
Nehmy et al. (2015) [51]	Self-judgement (Unhelpful perfectionism)	CBT	No significant effect	SCS $d = .05, p = .010$
Nehmy et al. (2015) [51]	Negative affect (Unhelpful perfectionism)	CBT	No significant effect	DASS-21 $d = .03, p = .010$
FEEDING AND EATING DISORDERS				
Johnson et al. (2016) [45]	Anxiety	ACT	No significant effect	DASS-21 $d = .03, p < .01$
Johnson et al. (2016) [45]	Depression	ACT	No significant effect	DASS-21 $d = .01, p < .05$

Johnson et al. (2016) [45]	Emotional dysregulation	ACT	No significant effect	DERS $d = .11, p < .05$
SLEEP-WAKE DISORDERS				
Blake et al. (2016) [35]	Anxiety (Sleep difficulties)	CBT and Mindfulness and sleep intervention	Significant small effect	SCAS $\eta^2 = .02, p = .036$
Blake et al. (2016) [35]	Depression (Sleep difficulties)		No significant effect	CESD $\eta^2 = .01, p = .394$
DISRUPTIVE, IMPULSE-CONTROL, AND CONDUCT DISORDERS				
Hitchcock et al. (2017) [44]	Aggression	CBT	No significant effect	CBCL $c2 = .74 p = .69$
Ritzi et al. (2016) [58]	Aggression	Play therapy	No significant effect	(CBCL $\eta^2 = .322, p < .001$); (TRF $\eta^2 = .130, p = .012$)
Havighurst et al. (2015) [42]	Conduct disorder	Child and parent emotion and socialization	No significant effect	ECBI-P $p = .012, d = .37$
Havighurst et al. (2015) [42]	Oppositional defiant disorder	Child and parent emotion and socialization	Significant medium effect	ECBI-P $d = .37, p = .011$
Hitchcock et al. (2017) [44]	Rule breaking	CBT	No significant effect	CBCL $c2 = 1.861 p = .45$
Ritzi et al. (2016) [58]	Rule breaking behavior	Play therapy	No significant effect	(CBCL $\eta^2 = .157, p = .002$); (TRF $\eta^2 = .098, p = .068$)
Quinlan et al. (2014) [56]	Hyperactivity (Refugee background)	Arts psychotherapy	No significant effect	SDQ-T $d = .52, p = .11$
Hitchcock et al. (2017) [44]	Hyperactivity	CBT	No significant effect	CBCL $c2 = .28 p = .87$
Nathan et al. (2013) [50]	Hyperactivity	Football	No significant effect	SDQ $d = .04, p = .82$
Havighurst et al. (2015) [42]	Hyperactivity	Child and parent emotion and socialization	No significant effect	ECBI $p = .066, d = .29$
Gold (2017) [41]	Externalizing problems	Music therapy	No significant effect	ICC = 0.02
Hitchcock et al. (2017) [44]	Externalizing problems	CBT	No significant effect	CBCL $c2 = 2.63 p = .27$
Dray et al. (2017) [40]	Externalizing problems	Emotion regulation and behavioral activation	No significant effect	SDQ $d = .08, p = .02$
Ritzi et al. (2016) [58]	Externalizing problems	Play therapy	No significant effect	(CBCL $\eta^2 = .277, p < .001$); (TRF $\eta^2 = .135, p = .024$)
AUTISM SPECTRUM DISORDER				
Afsharnejad et al. (2021) [34]	Autistic traits	Social skills group training	No significant effect	SRS-2 $d = .32, p = .14$
	Social anxiety (ASD-related)	Social skills group training	No significant effect	SIAS $d = .47, p = .03$
Ratcliffe et al. (2014) [57]	Behavioral issues (ASD-related)	Social and emotional learning	No significant effect	(SDQ-P $d = .51, p = .21$); (SDQ-T $d = .05, p = .10$)

O'Haire et al. (2014) [52]	Social approach behaviors (ASD-related)	Animal therapy	Significant medium effect	(PDDBI-T $d = .64, p < .001$; PDDBI-P $d = .35, p = .012$)
	Social withdrawal behaviors (ASD-related)	Animal therapy	Significant medium effect	(PDDBI-T $d = -0.59, p < .001$; PDDBI-P $d = -0.40, p = .007$)
SUBSTANCE RELATED AND ADDICTIVE DISORDERS				
Wagner et al. (2020) [63]	Behavior problems (Fetal Alcohol Spectrum Disorder)	SEL regulation and executive function	No significant effect	(ECBI-T Exp(b) = 1.31, $p < 0.001$); (SESBI-T Exp(b) = .59, $p < 0.001$); (ECBI-P Exp(b) = 1.07, $p < 0.037$); (SESBI-T Exp(b) = .97, $p = .328$)
Teeson et al. (2020) [61]	Depression (Substance use)	Alcohol, cannabis and mental health education	No significant effect	PHQ-8 $d = 0.06$
Teeson et al. (2020) [61]	Anxiety (Substance use)		No significant effect	GAD-7 $d = 0.04, p$ unknown

η^2 : Partial eta squared; C: Child; P: Parent; T: Teacher; ACT: Acceptance and Commitment Therapy; ASD: Autism Spectrum Disorder; CBT: Cognitive Behavioral Therapy; AIQ: Anxiety Interference Questionnaire; CASI: Childhood Anxiety Sensitivity Index; CBCL: Child Behavior Checklist; CDI: Children's Depression Inventory; CDRS: Children's Depression Rating Scale; CES-D: Centre for Epidemiological Studies-Depression; CRIES: Children's Revised Impact of Event Scale; CSQ: Children's Stress Questionnaire; DASS: Depression, Anxiety Stress Scales; DERS: Developmental Environment Rating Score; ECBI: Eyberg Child Behavior Inventory; GAD: Generalized Anxiety Disorder; HSCL: Hopkins Symptom Checklist; ICC: Intra-correlation Co-efficient; K: Kessler; MASC: Multidimensional Anxiety Scale for Children; MDI: Mental Developmental Index; PDDBI: Pervasive Developmental Disorder Behavior Inventory; PHQ: Patient Health Questionnaire; PSWC: Penn State Worry Questionnaire; RADS: Reynolds Adolescent Depression Scale; RCDAS: Revised Children's Anxiety and Depression Scale; SAS: School Anxiety Scale; SCAS: Spence Children's Anxiety Scale; SCS: Self-Compassion Scale; SDQ: Strengths and Difficulties Questionnaire; SESBI: Sutter Eyberg Student Behavior Inventory; SIAS: Social Interaction Anxiety Scale; SIQ: Suicide Ideation Questionnaire; SMFQ: Short Mood and Feelings Questionnaire; SRS: Social Responsiveness Scale; TRF: Teachers Report Form

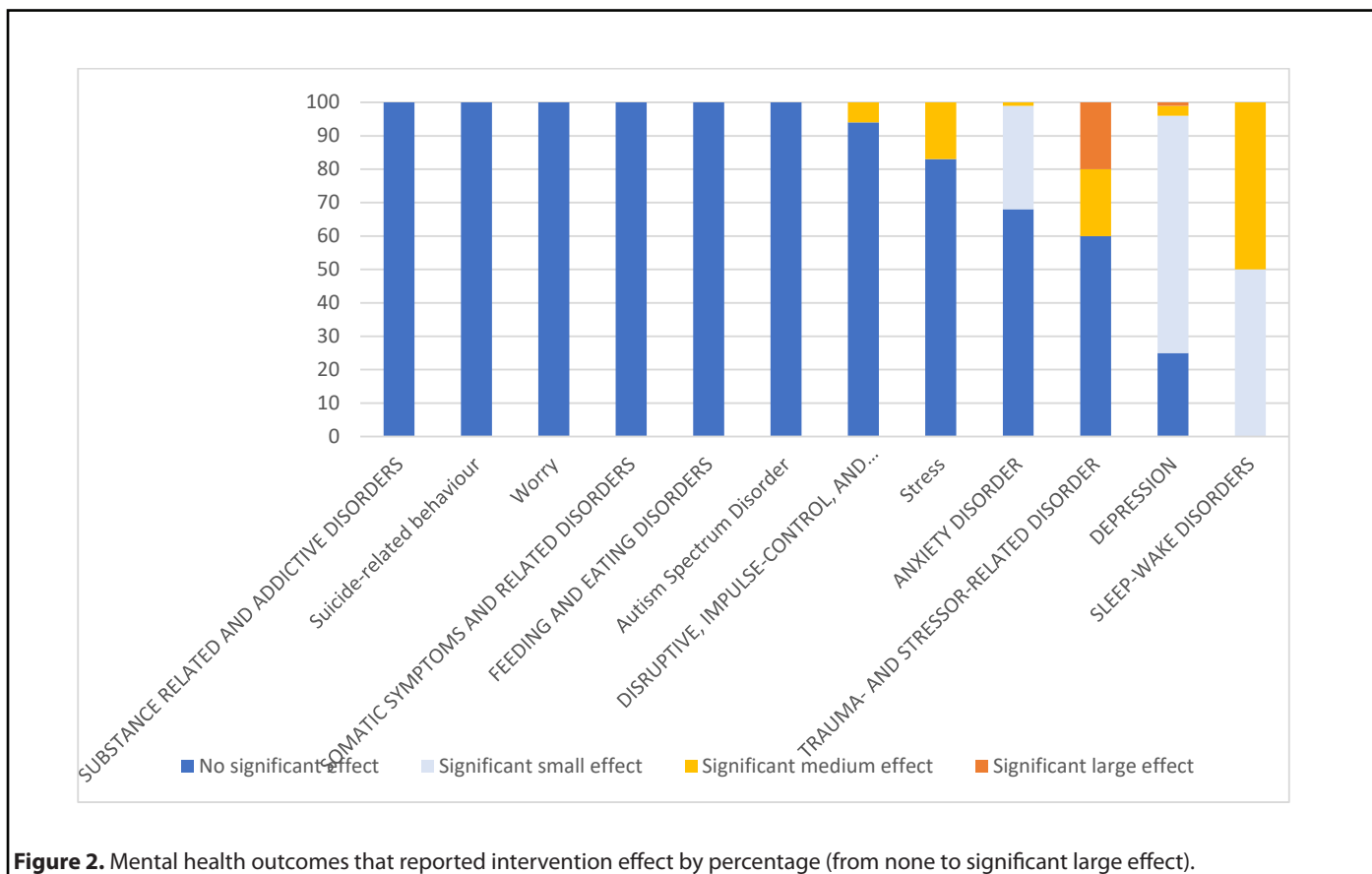


Figure 2. Mental health outcomes that reported intervention effect by percentage (from none to significant large effect).

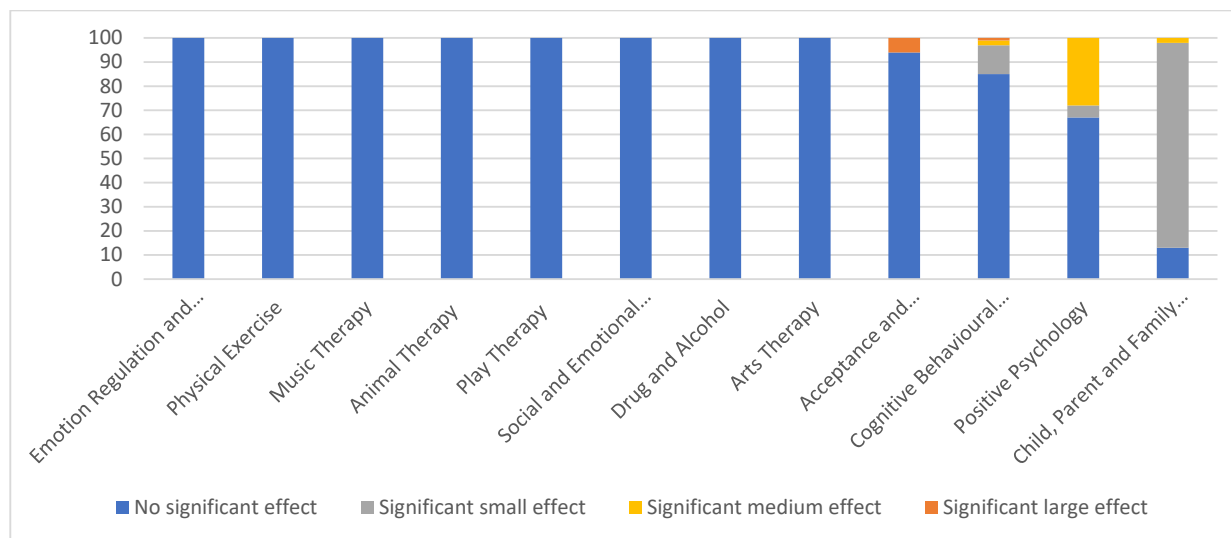


Figure 3. Intervention areas that reported a significant effect by percentage (from none to significant effect).

Anxiety symptoms

Anxiety predominated school-based mental health measures. Seventeen interventions (that included 26 assessments) measured anxiety and anxiety-related outcomes. One study reported a significant medium effect on anxiety using CBT [49]. However, five other studies that used CBT reported no statistically significant effect [39,44,55,59,64]. Two studies reported a significant small effect on anxiety using positive education [38] and supporting family environments [60]. Another intervention that attempted to reduce anxiety and anxiety-related symptoms in children and adolescents included positive psychology [36,37] but report no significant effect on anxiety outcomes. Mixed results were reported for child, parent and family interventions with one reporting a significant small effect [60] but another reporting no significant effect [65].

Two interventions that measured generalized anxiety using CBT reported no significant effect [55,39]. Three interventions using emotion regulation [40], music therapy [41], and CBT [44] all reported no significant effect on internalizing problems.

Stress

Stress is a common trigger for anxiety, and five studies (using six assessment tools) measured stress [36,37,53] including stress-related internalizing behaviors [54] and stress-related depression [53]. Two studies (17% of participants) reported a significant medium effect on stress reduction using positive psychology with acceptance and commitment therapy [36,37] and group CBT [54]. However, 83% of participants whose stress related outcomes were measured, showed no statistically significant effect.

Worry

Worry is a component of anxiety symptoms and two studies [39,46] measured the impact of CBT and psychoeducation, and emotion regulation and behavioral activation, respectively. Both reported no significant effect on worry outcomes.

Depression

Comorbid with anxiety is depression. Six studies reported a significant small effect on depression. Three studies used CBT [49,55,62,64]. However, three other studies reported that CBT intervention did not have a significant impact on reducing depression and related symptoms including somatic complaints, thought problems and inattention [35,44,49,59]. The other three studies that reported a significant small effect on depression used positive education [38] and family support [60]. Significant medium effects were reported in two studies using acceptance and commitment therapy [37,47] and a significant large effect was measured on dysphoria [47]. Twenty-five percent of participants reported no significant effect on depressive symptoms.

One study [43] measured suicide-related outcomes using CBT as an intervention. No significant effect was reported.

Trauma- and stressor-related disorders

A large effect was reported on PTSD and a medium effect on PTSD-related depressive symptoms when using a group CBT intervention, but no significant effect was reported on externalizing behavior [54]. Another study reported no significant effect on trauma and stressor related disorders using arts psychotherapy on children and adolescents from refugee background [43].

Somatic symptoms and related disorders

Three interventions measured somatic related outcomes [44,47,51] but reported no intervention effect from cognitive based therapy or acceptance and commitment therapy.

Disruptive, impulsive-control and conduct disorders

A range of behavioral issues presented in school settings. One study reported a significant median effect on oppositional defiant disorder, using child and parent, emotion, and socialization techniques [42]. However, this intervention method did not have an effect on conduct disorder or hyperactivity. Students presenting with behavioral problems related to aggression were given play therapy [58] and CBT [44] but significant effect was reported. Rule breaking was also addressed using CBT [44] and play therapy [58] but was also reported to be not effective. Hyperactivity and externalizing problems were addressed using a battery of interventions including football [50], arts psychotherapy [43], music therapy [41] and emotion regulation and behavioral activation [58]: they all had no significant intervention effect on hyperactivity and externalizing problems.

Autism spectrum disorder (ASD)

Three interventions (measuring four mental health outcomes) targeted autistic traits and mental health issues related to students diagnosed with ASD. ASD students with social anxiety were given social skills group training; but reported no significant effect [34]. Students with behavioral issues were given social and emotional learning skills [57], without significant effect. However, animal therapy [52] had a significant effect on autism traits including social approach behaviors and social withdrawal behaviors.

Substance related and addictive disorders

Two interventions reported on substance related and addictive disorders. No significant effect was reported on behavior problems and behavior intensity measures from an intervention based on social and emotional regulation and executive functioning [63]. The other study measured the outcome of alcohol, cannabis, and mental health education on depression and anxiety outcomes [61]. This study also reported no significant effect.

Children and young people with fetal alcohol spectrum disorder were given an intervention based on social and emotional regulation and executive functioning [63]. Significant intervention impact was reported in behavior problems and behavior intensity.

Feeding and eating disorders

Feeding and eating disorder was addressed using acceptance and commitment therapy [45]. However, no significant

intervention effects were reported on anxiety, depression, or emotional dysregulation of students with this disorder.

Other

One study reported on participants with sleep-wake disorder using CBT and mindfulness practice [35]. This study reported a significant small effect on anxiety, but no effect was reported on depression. Likewise, no significant effect was reported in another CBT intervention for students with unhelpful perfectionistic behavior that targeted negative affect, self-judgement, and unhelpful perfectionism [51].

Discussion

The core business of schools is education. While schools provide effective learning and teaching, school policy outlines that this should occur “within secure, well-managed environments, in partnership with parents, carers and the wider school community” where “well-being, safety and health of students is a priority” [66]. The mental health of students and their peers, teachers, and other school staff falls within the purview of schools, insofar as it impacts teaching and learning outcomes. As we have argued previously [67], increasingly, teachers and schools have taken on the responsibility of triage and managing the mental health of students through universal and targeted school programs. In support of the WHO’s school-based initiatives to support school mental health, this systematic review reports on the effect of school-based interventions on mental health outcomes of children and adolescents in Australia. Seventeen interventions, comprising 33% of the total sample size, reported a statistically significant effect on one or more mental health outcomes. Overall, our review supports global and population-based analysis by Polanczyk and colleagues [68] where programs showed none to small effects on mental health outcomes from school-based interventions.

The highest success rate for intervention effect was using child, parent, and family involvement to support children and adolescents with a mental disorder. Our research supports the findings of O’Reilly and colleagues [32] and Orygen [10] who highlighted the importance of working collaboratively with community. The next area of success in addressing mental health issues was with positive psychology techniques, followed by weak and mixed effects reported with the use of CBT. These results are similar to the conclusions made by Caldwell and colleagues [8] and Blake colleagues [35], we also found a significant effect from mindfulness and relaxation-based intervention for anxiety and anxiety-related issues.

Two further areas showed a significant impact. Sleep-wake disorders showed a small to medium effect from CBT and from mindfulness therapy. Trauma and stressor-related disorders showed a large effect from group CBT. However, both areas involved single studies with small sample sizes so that our

results in these two areas require replication for their findings to be considered weighted evidence. Many interventions targeted depression and anxiety. CBT as an intervention gave mixed results in terms of impact on depression and anxiety: one study reported CBT to be effective, while five others reported no significant effect.

Our systematic review showed less of an effect on depression overall compared to other key reviews [7,11,12]. However, those reviews reported on RCTs alone, whereas we had 8 out of 32 studies that were non-RCTs, which is representative of the designs of interventions implemented in schools. The results of our systematic review support the findings by Orygen, which indicates that there is “a lack of strong, consistent evidence for the effectiveness of universal or targeted SBMHPs [school based mental health programs] in preventing anxiety or depression” [10, Page 5].

Importantly, our systematic review revealed mental health areas where several intervention methods did not report a significant result. For ASD, social skills training and animal therapy both reported no significant results. Acceptance and commitment therapy as an intervention for feeding or eating disorders in adolescents showed no significant effect. For substance related and addictive disorders, social and emotional regulation, and executive function, as well as alcohol, cannabis and mental health education were used, without reporting a statistically significant effect on mental health outcomes. CBT and acceptance and commitment therapy were used for adolescents presenting with somatic symptoms and related disorders, with no significant intervention effects reported.

The quality of studies was evenly distributed with a third of interventions each having low, medium, or high study quality scores. All high-quality studies reported no significant effect, with the exception of one study, which reported a small effect on anxiety from a sleep intervention. By contrast, studies with low study quality scores tended to report higher intervention effects with a quarter of interventions with low study quality scores reporting a small to large intervention effect on depression-related outcomes.

While nearly 85% of the interventions in this systematic review were delivered by trained and untrained school staff, there is insufficient evidence to enable analysis of associations between delivery personnel and intervention success. However, a recent systematic review shows that trained teacher-delivered interventions are effective for implementation of school-based interventions [69], although this finding is not supported by previous research [12]. No association was found between exposure and intervention effect, although sustainability and duration are considered beneficial to producing long-term results in students [60,70].

The purpose of our research was to provide a responsive systematic review of the Australian context of the effectiveness

of school-based mental health interventions. Countries differ in funding models and geopolitical status, however, a coordinated effort called for by the World Health Organization has yet to be provided of local contexts, which we have provided. Moreover, our research is timely given the increase in the number of young people presenting with mental health issues [71]. The question of why children and adolescents are increasingly presenting with mental health issues is beyond the scope of the data-search conducted for this systematic review. All we know from the evidence-base is that there are many stressors that result in children presenting with mental disorders, and there are some interventions that are known to help reduce symptoms in some children with some disorders. All we know logically is that early intervention is an effective strategy, and that is why schools are an important site for early detection and intervention success [10].

Further, our aim was to draw attention to the vast range of mental health support provided by schools in Australia and compensate for the under-representation of Australian school-based mental health interventions in international reviews. The ‘Australian Educational Leader’ suggested that one reason for their under-representation may be low study quality and suggested that “more high-quality program evaluations are needed across Australia” [70, page 43]. Our review found that a third of the studies had low study quality suggesting that program fidelity and rigor are needed in program design across Australian school-based interventions [72]. We noted that increased fidelity will not necessarily increase intervention effect: we can only suggest that increased rigor is needed for the purpose of evaluation to know if the allocation sequence was adequately generated and that the effects (or no effect) calculated are accurate. According to a recent ‘National Study of Mental Health and Wellbeing’, mental health issues rose by 50% in 16–24 year-olds in Australia between 2007-2021 [73]. Post pandemic, it is likely that these values are higher: therefore, school-based mental health support is surely needed.

There were several limitations to this review. First, the search period included COVID-19 lockdowns and school closure. Even after returning to school, all external research (via ‘State Education Research Application Process’ (SERAP)) was banned for approximately two to three years to reduce the burden on schools. Through our direct communications with SERAP, we are informed that these restrictions remain in place while schools adjust to COVID-19 and subsequent administrative changes currently underway in government schools. As such, our review, which focused on data collected prior to COVID-19 provides some of the latest research related to schools. Future studies might focus specifically on post pandemic measures of mental health in school-based settings, which are likely to reveal greater mental health and wellbeing needs. However, the mental health interventions used today are still based on an evidence-base of previous interventions. Since our review focusses on this evidence base, and is not a prevalence study,

our findings are current and relevant to school interventions. Second, there was significant heterogeneity among mental health programs that meta-analysis was not possible. However, our aim was to study a representative sample of school-based programs, which include both qualitative and quantitative studies. Third, some intervention measures were based on self-report or from one source and were not always verified by clinician measures. Therefore, some of the measures may suffer from acquiescence resulting in false positives. Fourth, this review included published interventions in peer-reviewed journals, which excluded many ongoing mental health programs currently running in Australian. Finally, this review only found one intervention related to Aboriginal children. More research is needed of disadvantaged communities, who are known to experience higher rates of mental illness.

Conclusion

Schools are important in the community management of the mental health of children and adolescents. In terms of providing mental health support, schools form the crucial link between healthcare and family, carers, healthcare workers (psychologists, general practitioners, and child specialists) and community services (hospitals, rehabilitation and socialist centers). However, the effectiveness of many programs has come under scrutiny under the challenge of funding cuts and our research suggests that many interventions in Australia are underpowered with two thirds of interventions not providing a measurable intervention effect on mental health outcomes. National reports suggest that higher numbers of students are being diagnosed with mental disorders, which places an increasing burden on schools to manage their mental health more effectively. Further research is needed to see if interventions can be made consistently effective focusing on success factors. These factors involve strengthening community involvement both in terms of family involvement using a wrap-around care management system based on access to healthcare workers, community services, and government departments. Researchers, healthcare workers, and school staff may be able to implement more successful intervention strategies through cooperation and alignment with the multiple healthcare providers across community support systems. The overall findings suggest that investment in school-based programs is needed as an investment in detection and prevention plans for managing the mental health of children and young people.

Author Contributions

Conceptualization, H.G.; methodology, H.G. and A.V.; software, H.G.; validation, H.G., A.V. and R.W.; formal analysis, H.G. and A.V.; investigation, H.G.; resources, H.G.; data curation, H.G.; writing—original draft preparation, H.G.; writing—review and editing, H.G., A.V. and R.W.; supervision S.C. and I.B.H.; funding acquisition I.B.H.; project administration, H.G.

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Data Availability Statement

The datasets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Conflicts of Interest

IBH is the Co-Director, Health and Policy at the Brain and Mind Centre (BMC) University of Sydney. The BMC operates an early-intervention youth services at Camperdown under contract to headspace. He is the Chief Scientific Advisor to, and a 3.2% equity shareholder in, InnoWell Pty Ltd. InnoWell was formed as a joint venture by the University of Sydney (32% equity) and PwC (Australia; 32% equity) to deliver the \$30m Australian Government- funded Project Synergy (2017-20; a three-year program for the transformation of mental health services) and to lead transformation of mental health services internationally through the use of innovative technologies. There are no relevant disclosures for other authors.

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