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School-based interventions that support mental health and psychosocial wellbeing in low- and middle-income countries

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Syeda Kashfee Ahmed, Anna Dabrowski, Katherine Dix, and Toby Carslake

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School-based interventions that support mental health and psychosocial wellbeing in low- and middle-income countries.

The Australian Council *for* Educational Research
19 Prospect Hill Road
Camberwell VIC 3124
ABN 19 004 398 145

www.acer.org
www.acer.org/au/gem

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Contents

List of Figures

List of Tables

Glossary of Terms

The following terms are used for the purposes of this report:

Academic achievement or outcomes	In the context of this report, academic achievement or outcomes refer to the actual level of academic performance a student has achieved, such as Grade Point Average (GPA), grades, proficiency levels, numeracy or literacy test scores, and other academic measures. It is often used as a measure of a student's success in meeting academic standards and expectations.
Academic readiness	Academic readiness refers to a student's level of preparedness and capability to succeed in an educational setting. It encompasses a range of skills, knowledge, and attributes that enable students to effectively engage in learning and excel academically, such as working memory, executive function, self-regulation, perseverance, learning skills, flexible thinking, academic self-esteem, and academic competence. It is an indicator of a student's potential for success rather than a measure of their current performance. Also see "readiness".
Blinding of participants or outcomes in research design	Blinding is a crucial methodological technique in experimental research aimed at minimising bias and ensuring the validity of results. It involves keeping certain individuals involved in the research process unaware of specific information to prevent their biases or expectations from influencing the outcomes.
Child and adolescent	According to the Convention on the Rights of the Child (CRC), child is defined as all children and adolescents aged 0–18 years of age. Adolescents are individuals in the 10–19 years age group.
Cognitive behavioural therapy (CBT)	Cognitive behavioural therapy (CBT) is a type of psycho-social intervention where a therapist works one on one with an individual to help them cope with or reduce the symptoms of specific mental health conditions such as depression, anxiety or conduct disorders.
Critical appraisal	In the context of this review, this is the systematic evaluation of research studies included here with the aim to establish whether an included study has a clearly focused research question, the validity of the methods used to address this question, and the validity of its results.
Disability	Persons with disabilities include those who have long-term physical, mental, intellectual or sensory impairments which in interaction with various barriers may hinder their full and effective participation in society on an equal basis with others.
Early childhood	The early childhood period encompasses several quite distinct phases: from 'conception to birth' and from 'birth to 3 years', with emphasis on the first 1,000 days (from conception to 24 months), followed by the 'preschool and pre-primary years (3 years to 5 or 6 years, or the age of school entry).
Early intervention	Early intervention relates to supporting children and young people, usually in educational settings, with clear referral pathways and processes after exposure to potentially traumatic events or distressing situations. The frameworks support engagement and connectedness and facilitate help-seeking and seek to prevent or minimize psychological suffering and mental health consequences. Early intervention encourages effective partnerships with specialised support to ensure a child or young person's learning and development is integrated and holistic.

Engagement	Within an educational context, engagement means students directing their attention and energy towards a particular task or activity. In the classroom, the term 'engagement' is often used to refer to the extent of students' active involvement in a learning task. It does not refer to enrolment or attendance.
Evidence-base	Refers to a body of information, knowledge, and research findings that serve as a foundation for making informed decisions, developing policies, or establishing practices in education. In this context it has involved systematically gathering the best available evidence through a critical appraisal process.
Experimental design	Experimental design is a style of undertaking research using a scientific approach, that uses analysis to prove or disapprove a hypothesis about a cause-and-effect relationship. It is the design that allows the analysis of causal relationships, typically through pre- mid- and post-test and randomised comparison groups. Also see the terms quasi-experimental and RCT.
Families	The term 'families' encompasses parents, caregivers, guardians, and other adults responsible for the care of children and young people. In some international contexts this may also include supports outside of the immediate family, such as adults from religious support groups and other community members who are responsible for the care of children and young people.
Forest plot	A forest plot is a graphical representation of the results from multiple studies or subgroups within a study that investigate the same research question. It is commonly used in meta-analyses and systematic reviews to visually summarize and compare the effect sizes and confidence intervals of individual studies or subgroups.
Hedges' g	Hedges' g is a statistical measure used to estimate the effect size between the outcomes of two groups – the treatment (wellbeing intervention) and the control (wait-list group, business-as-usual, or pre-test). It is similar to Cohen's d but incorporates a correction for small sample sizes.
Learning environment	A collective term, learning environment, can refer to an educational approach, cultural context, or physical setting in which teaching and learning occurs. This could include traditional contexts like classrooms or home but can also include digital context.
LGBTIQA+	LGBTIQA+ is an evolving acronym that stands for lesbian, gay, bisexual, trans/transgender, intersex, queer, asexual, and other sexuality, gender, and bodily diverse people and communities.
Low- and middle-income countries (LMIC)	According to the World Bank, low- and middle-income countries (LMIC) are defined as those with a GNI per capita between $1,036 and $4,045; and upper middle-income countries – those with a GNI per capita between $4,046 and $12,535 (2021). Low- and middle-income countries are home to 75% of the world's population and 62% of the world's poor.
Mental health	A state of the human mind in which every individual realises their potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to contribute to their community. Like 'wellbeing' (see term below), mental health is a positive concept which refers to the social and emotional wellbeing of people and communities. It relates to enjoyment of life, ability to cope with stress and sadness, fulfilment of goals and potential, and sense of connection to others.

Mental health prevention	The practice of reducing risk factors and enhancing protective factors associated with mental health difficulties. Intervening to reduce the incidence, prevalence and recurrence of mental health problems. It may involve universal, targeted or indicated preventive strategies by addressing determinants of mental health problems before a specific mental health problem has been identified in the individual, group, or population of focus with the ultimate goal of reducing the number of future mental health problems in the population.
Mental health promotion	Intervening to optimise positive mental health and psychosocial wellbeing by intentionally creating a learning environment that supports mental health and addressing determinants of positive mental health before a specific mental health problem has been identified, with the ultimate goal of improving the positive mental health of the population.
Minority status	A minority status refers to people in smaller groups, whose ethnic, religious, or linguistic identities are different to most others in a larger community, i.e. their numbers are usually lower than half the population in a certain geographic location. The type of minority is context dependent and is usually defined by the local authority or community. People under this grouping usually are at a disadvantage because of not holding the dominant status within the population.
ngram	Phrases entered into the Google Books Ngram Viewer are graphed to show their relative frequency of occurrence (%) in a corpus of books (e.g., British English) over the selected years.
Positive school climate	A positive school climate refers to the quality and character of school life. In the context of mental health and wellbeing, a positive school climate has shown to create perceptions of social, emotional, physical and psychological safety.
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses (Moher et al., 2009). PRISMA was developed to ensure consistent and transparent reporting by systematic reviewers about a review search process, with clear steps outlining what the authors did, why, and what they found.
Program intervention	In the context of this study 'program intervention' refers to any program, initiative, service, approach, process, or treatment designed to improve mental-health related outcomes, including the program's tools, resources, digital applications, support materials and any other inputs that are part of the intervention.
Protective factors	Factors that reduce the likelihood of poor mental health either on their own or when risk factors are present. For example, being physically healthy, having positive family relationships, peer role models and student-educator relationships.
Psychosocial	Considers the combined influence of individual thoughts and behaviours, and the surrounding social environment on individual's physical and mental wellness and ability to function.
Quasi-experimental design	Quasi-experimental designs share some similarities with experimental research designs, but they lack one key element: random assignment of participants to different groups.

Randomised control trial (RCT)	A RCT study in which the participants are randomly assigned to one of two groups: one (the experimental group) receiving the intervention under study, and another (the control group) who do not receive the intervention. As such, RCTs are used to determine a cause-and-effect relationship between the intervention and outcomes.
Readiness	Readiness is the capacity to undertake something or being fully prepared for it. It is used in the student context of "academic readiness" (see above) and at the school level, to explain the preparedness of education systems to uptake certain types of programs, such as school mental health and wellbeing programs.
Risk factors	Factors that increase the likelihood of poor mental health. Risk factors can relate to the individual, family circumstances, peers, school and broader community. Other crucial factors include exposure to traumatic events or severely distressing situations, having poor social skills, experiencing violence in the home, not having access to essential services such as health and education, and poor peer role models or student-educator relationships.
School communities	A school community usually refers to all the school stakeholders, i.e., students, teachers, school leaders, other school staff, school management committees, parents, other family members and the local community who learn from each other and collaborate inside and outside the classrooms.
Social and emotional learning (SEL)	Social and emotional learning (SEL) is a process of acquiring social and emotional values, attitudes, competencies, knowledge, and skills that are essential for learning, being effective, wellbeing, and success in life.
Targeted intervention	Targeted mental health interventions are aimed at students who are deemed at risk of developing mental health conditions or who require specific support. Targeted programs generally aim to address more defined or complex mental health needs, such as anxiety and depression.
Universal intervention	Universal mental health interventions are broadly non-clinical and focus on prevention and protective factors within a broader population setting. Examples include programs designed at building social and emotional learning skills, developing a growth mindset, resilience etc.
Wellbeing	Wellbeing can be described as having positive physical and emotional health outcomes, such as a sustainable mood and attitude towards life, being resilient during hard times and a feeling of satisfaction with self, relationships and or experiences at school. In children and adolescents, it results from the interplay of physical, psychological, cognitive, emotional, social and spiritual aspects that influence a child's and adolescent's ability to grow, learn, socialize, and develop to their full potential.

Executive Summary

Objectives of this review

The importance of supporting and promoting student mental health is widely acknowledged, including in low- and middle-income countries (LMIC) (Lencucha & Neupane, 2022). Although awareness of student mental health is not new, there has been a shift in the ways in which support services, including education settings, respond to student mental health needs. School related closures and disruptions to mental health services linked to the COVID-19 pandemic have significantly impacted the lives of many children, young people, and their families, and their ability to access help. For this reason, educational settings such as schools face increased responsibility for providing emotional support and stability for students, and educators, resulting in a surge of school-based mental health programs.

It is encouraging to see a focus on student mental health increasingly reflected in international education policies. However, the growing number of school-based mental health and wellbeing programs makes it challenging to identify quality interventions that effectively support student mental health, and even harder to identify evidence-based programs that link mental health support to learning. There is also a lack of comprehensive evidence on the effectiveness of mental health and wellbeing interventions in relation to student academic outcomes, particularly in LMIC. In response to renewed interest in understanding how the education sector can provide effective mental health support in LMIC, this Rapid Evidence Assessment aimed to provide new evidence on mental health programs that support both student wellbeing as well as academic outcomes in LMIC.

In particular this review investigated:

- the effectiveness of school-based interventions that support mental health promotion and psychosocial wellbeing for students aged 5–19 years in LMIC, and
- the influence of such programs on academic readiness and student academic achievement.

Methods

As recommended by Barends et al. (2017), the effectiveness of school-based mental health interventions for students in LMIC was investigated using the Rapid Evidence Assessment approach, outlined in Figure 1. It shows that the rapid search and review of academic literature, supplemented by grey literature and policy analysis, resulted in the identification of 92 studies. Following critical appraisal of the studies, 34 school-based mental health interventions from LMIC met the necessary criteria and were selected for inclusion in the analysis. The interventions were examined for effectiveness in supporting mental health and wellbeing, as well as assessing academic improvements.

Figure 1: The Rapid Evidence Assessment approach

Findings

The main findings reported here were based on the analysis of the 34 carefully selected school-based wellbeing interventions in LMIC. These LMIC studies were also compared to 56 studies from high-income countries (HIC) identified in a previous study (Dix et al., 2020) to compare the characteristics of programs implemented in LMIC and HIC.

The 34 interventions implemented in LMIC were geographically diverse in nature, as illustrated in the interactive map. The focus of the programs also differed. For example, 39% of programs were categorised as targeted early-intervention programs for at-risk students, while 61% were universal preventative interventions delivered at the classroom or whole-school level.

Overall, the findings suggest that wellbeing-related interventions are effective at improving student wellbeing and academic outcomes when implemented in LMIC.

The evidence from this rapid review suggests the interventions may be having greater impact in LMIC than when implemented in HIC, possibly because in LMIC there is more need and greater scope for improvement in student outcomes. Moreover, the results also demonstrate strong positive relationships linking improvement in student mental health and wellbeing outcomes, with improvements in academic readiness and academic achievement.

The meta-analysis of evidence on school-mental health and wellbeing-related interventions showed significant gains for student in the intervention groups. Students were more likely to have:

- improved social-emotional skills,
- increased behavioural-cognitive skills, and
- greater levels of physical activity and relaxation.

Examining the characteristics of interventions showed differences in the approaches used in LMIC contexts, similar to those found in HIC (Dix et al., 2020).

- **Duration** (short, moderate, long): Shorter programs conducted within a school term (3 months), were generally more effective than longer-running programs, of one year's duration or more. Shorter programs may also have cost benefits.

- **Setting** (primary and secondary schools): Secondary school interventions in LMIC tended to have a larger positive effect on wellbeing and academic outcomes when compared to primary school interventions. The onset of mental health difficulties typically emerges in early adolescence, presenting greater opportunity to address need and effect change. However, this finding does not discount the importance of mental health promotion and early intervention in primary schools.
- **Program aim** (targeted or universal): Targeted interventions that focussed on supporting specific cohorts of students (e.g., mental health conditions like anxiety, disadvantaged or at-risk students) appeared to be more effective than universal programs designed to support all students. However, the best outcomes may be achieved when targeted programs are delivered in parallel to a universal approach.

Evidence gaps in LMIC

The following gaps in the LMIC evidence on the effectiveness of school mental health and psychosocial wellbeing programs were identified. These gaps lead to the following areas for future research and investment.

- **Readiness:** There is a lack of information in LMIC on the readiness of schools and school systems to implement mental health interventions. Assessing readiness prior to the implementation of an intervention can reduce the stigma associated with mental health problems and improve the uptake and acceptance of targeted programs.
- **Program aims**: Information on interventions focused on mentoring, and interventions focused on preventing school aged children from substance abuse are not present in LMIC. Both areas of focus are present in effective interventions in HIC and may relate to differences between LMIC and HIC contexts.
- **Teacher and community involvement**: There is a lack of information on how the interventions reviewed in this study involve or engage community members in supporting student mental health interventions, including teachers. There are no interventions focused specifically on supporting teacher mental health.
- **Prevention for adolescents**: There continues to be limited information on school-based mental health prevention in LMIC. However, given the age at which many mental health conditions begin, prevention and support, rather than treatment and response, are particularly important for this age group.
- **Diversity and inclusion**: Only a limited number of studies report evidence of improving wellbeing among students who may be at-risk of mental health difficulties based on gender, socioeconomic status, sexuality, visa status, religion, or cultural background. Discrimination based on minority status can contribute to student mental health conditions and reduce academic readiness and achievement.

Conclusion

Ongoing support and investment in mental health services remain important for all students, but particularly those in LMIC, where many young people face compounding risk to health and wellbeing. In these contexts, education systems and schools play an important role in reducing risk factors and promoting positive mental health that can lead to improved wellbeing and academic outcomes. However, there remains a lack of evidence on the effectiveness of these programs in LMIC.

This report demonstrates that school-based interventions have the potential to support student mental health as part of broader educational practice. The findings presented in this report also suggest that in LMIC, investment in interventions that promote student wellbeing may also lead to gains in student academic achievement, complementing traditional investment in literacy and numeracy initiatives. Integrating student mental health support as part of educational improvement agendas can only enhance the work already being done by teachers, schools, and education systems in LMIC, and create opportunities for students to learn, grow, and thrive.

Recommendations

For those seeking to implement or include a mental health agenda into education reforms, the following recommendations arising from this rapid review are provided.

Recommendation 1. Start early: Integrating a wellbeing focus in the early years can support student engagement and achievement, and build resilience into adulthood.

Recommendation 2. Reduce stigma and build readiness: Increasing mental health literacy and reducing stigma within communities is key to the effective implementation of mental health and wellbeing programs in educational settings. Investing in programs that recognise and respond to varying levels of readiness to engage in mental health practices, is pivotal for engaging children, adolescents, teachers, and families.

Recommendation 3. Support teachers: Providing training, time, and integrating mental health support into daily practices, can promote teacher commitment, involvement, and acceptance of student mental health programs.

Recommendation 4. Involve family and community members: Whole school approaches to mental health support that include family and professional community members ensure interventions have the desired impact and are culturally appropriate.

Recommendation 5. Contextualise programs: The most effective programs and practices in educational settings are targeted to support the needs of individuals in their own context and see mental health and wellbeing as an integral component of learning.

Recommendation 6. Focus on evidence: As not all student mental health programs are effective, it is important to invest in programs based on evidence, or insights from similar contexts and communities. Ongoing monitoring of mental health and wellbeing programs, and sharing of lessons learnt, is key to sustainable practice, quality, and impact.

Background

This report presents a Rapid Evidence Assessment examining the effectiveness of school-based wellbeing interventions in low- and middle-income countries (LMIC), that promote student mental health to support academic readiness and improved academic achievement. It acknowledges that schools play a critical role, not only in supporting academic success, but in nurturing the wellbeing of children and young people.

Mental health and LMIC

Despite the widespread awareness of mental health needs internationally (UNICEF, 2022), mental health conditions remain pervasive, including in children and young people. According to the World Health Organisation, depression is the top cause of mental illness, and mental health disorders are the leading cause of illness and disability in children and adolescents (WHO, 2021b).

Mental health conditions affect more than 13% of adolescents, who live with a diagnosed mental health condition, representing 86 million adolescents between the ages of 15–19 and 80 million adolescents aged 10–14 (UNICEF, 2021a). Adolescence is a peak time for the onset of mental health problems, with up to 50% of all cases occurring prior to 14 years of age (Kessler et al., 2005). Merikangas et al. (2010) found that the average age of onset for anxiety is six years old, 11 years for behavioural disorders, 13 years for depression and 15 years for substance use issues. Suicide is the fifth most prevalent cause of death for adolescent boys and girls aged 10–19; for adolescents boys and girls 15–19, it is the fourth most common cause of death, after road injury, tuberculosis and interpersonal violence (UNICEF, 2021a). While for girls aged 15–19, it is the third most common cause of death, and the fourth for boys in this age group (UNICEF, 2021a).

Anxiety and depression make up about 40% of diagnosed mental disorders, while other conditions include attention deficit/hyperactivity disorder, conduct disorder, intellectual disability, bipolar disorder, eating disorders, autism, schizophrenia, and personality disorders (UNICEF, 2021a). Substance use disorders, behavioural disorders (such as gambling), and online gaming disorders have also been now established as mental health conditions (American Psychiatric Association, 2023). Some individuals may only experience one condition or illness, while others may experience two or more at the same time (co-morbidities).

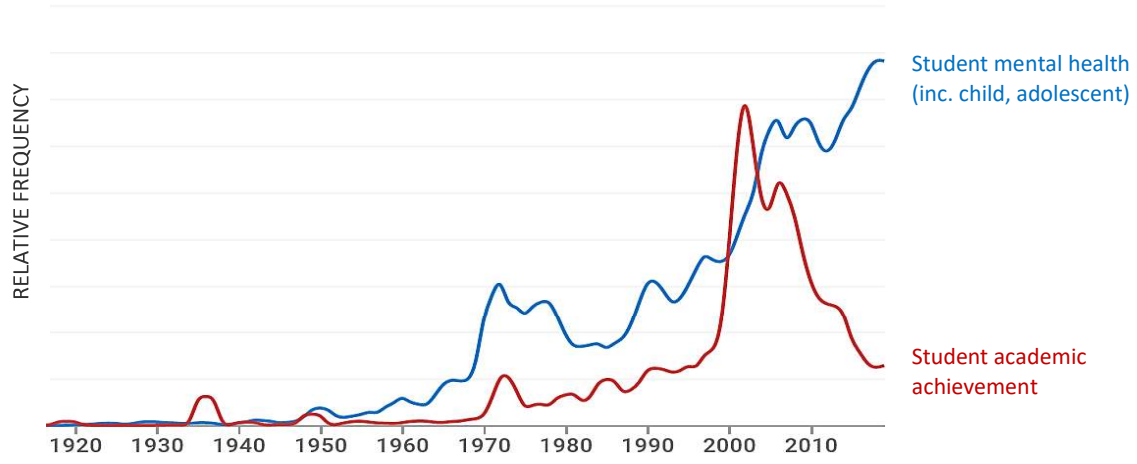
While mental health conditions are common, vulnerable, and marginalised children are far more likely to develop mental health conditions. Children and adolescents with disabilities, those of LGBTIQ+ orientation, those who are homeless or exposed to violence, trauma, conflict, or displacement, and those with a family history of mental health concerns are at greatest risk (Silove et al., 2017). For many young people in LMIC, this risk is exacerbated.

The onset of mental health conditions at an early age, and the high rates of suicide among adolescents, point to the need for early intervention (Berger et al., 2020). However, the majority of children still lack access to high-quality mental health services, particularly in LMIC (Patel et al., 2018). Stigma, human resource shortages, poor investment in mental health services for children and adolescents, fragmented service delivery models, and a lack of research capacity for implementation and policy change, contribute to the current mental health treatment gap (Patel et al., 2018). These concerns have only been exacerbated by the increasing frequency of natural disasters and the COVID-19 pandemic.

Schools, mental health, and learning

While schools are traditionally seen as places where young people acquire academic skills, they are also increasingly recognised as providing students with crucial opportunities to nurture mental health and wellbeing (OECD, 2017; Bücker et al., 2018; National Wellness Institute, 2018; Mahoney et al., 2020). Research has also established a link between positive mental health and improved academic outcomes (Dix et al., 2020).

In response, there has been an increasing focus on student mental health and wellbeing within the education sector, with student mental health now a greater area of focus than student academic achievement. As an example, the ngram in Figure 2 demonstrates the shift in focus in the last 20 years from 'student academic achievement' to 'student mental health'. It displays how the relative frequency of the phrases entered into ngrams have occurred in a corpus of books (in this case 'English 2019' was selected to include American and British English books) over the selected period of time (1920-2019).



Source: Google Books Ngram Viewer (Lin et al., 2012).
Specifications: phrase entered: student mental health + child mental health + adolescent mental health + student wellbeing, student academic achievement; Date range 1920-2019, note: 2019 is currently the maximum date; English books; Smoothing of 1.

Figure 2: Change in focus over time in student mental health and academic achievement

Despite increasing interest in student mental health, mental health services in educational settings are scarce, even in high-income contexts (Kratt, 2018). To address the growing service gap, education systems are focussing on promotion, prevention and early intervention. This has led to a dramatic rise in the number of school-based mental health and wellbeing-related programs being implemented in schools with mission to improve student learning outcomes by supporting wellbeing. Although many education systems do recognise positive student mental health as a key predictor of learning, there is a lack of comprehensive evidence of the effectiveness of mental health and wellbeing interventions in relation to student academic outcomes, particularly in LMIC (Dabrowski et al., 2022). This Rapid Evidence Assessment aims to address this gap.

The importance of mental health in learning

Mental health issues in childhood and adolescence result in impairments in social, emotional and behavioural domains, and lead to poor academic, educational, and employment outcomes, and disadvantage and poor health over the life span (Blaževic, 2016). Children and young people with mental health issues are at greater risk of school failure and absenteeism, disruptive classroom behaviour, and suspensions and expulsions from school (Ferguson & Wolkow, 2012). Long-term implications for children impacted by mental health issues include dependence on welfare, unemployment, and involvement in the legal system, including conflict with the law (Underwood & Washington, 2016).

In contrast, positive mental health is a protective factor that can help children to participate more fully in society, including in educational settings. Positive mental health is predictive of later life satisfaction, personal wellbeing, flourishing, and all four domains of quality of life: physical health, psychological wellbeing, social relationships, and environmental health (Singh & Junnarkar, 2015). Investing resources into preventative mental health programs also leads to reductions in violence, substance use, and mental health conditions (Alegría et al., 2018). Importantly, appropriate early intervention and care can reduce the risk of children ending up in detention, which can further exacerbate mental health conditions later in life (Holman & Ziedenberg, 2006).

Yet despite the importance of creating conditions for positive mental health, the topic of mental health remains hidden in many contexts. Low levels of awareness towards mental health often results in stigma, reduced help seeking behaviours, and lower engagement with health services (Henderson et al., 2013). Mental health treatment and resourcing also remains inaccessible due to cost and availability, particularly in disadvantaged communities and LMIC (Pundir et al., 2020). For vulnerable children and adolescents in these contexts, early identification and intervention are crucial, yet often remain out of reach. For this reason, educational settings have a key role to play in supporting the health and wellbeing of children and adolescents through promotion, prevention, and response programs.

Schools can be a non-stigmatizing setting, building common understanding and creating opportunities for discussion and reflection on the characteristics of both positive and

poor mental health, particularly through the implementation of a universal approach (Domitrovich, 2008; Weare & Nind, 2011).

Schools are also settings that can promote help seeking behaviours amongst both staff and students (Kutcher et al., 2016) and encourage student and staff engagement in preventative health and wellbeing programs. For students on a trajectory of poor mental health, early intervention can provide the crucial support, not only them but for their parents/guardians, siblings, and wider family (Foster et al., 2017).

For this reason, there has been a strong emphasis on school-based prevention and early intervention programs, including social-emotional learning programs. Overall, these aim to promote children's social and emotional competence and wellbeing, identify at-risk students, and reduce the likelihood of child and adolescent mental health concerns from developing (Corcoran et al., 2018). However, education systems around the world treat this topic differently, both directly through official policies and indirectly through cultural views on mental health and wellbeing.

The impact of COVID-19

While student wellbeing and mental health support is a focus for many education systems (Semple & Mayne-Semple, 2020), research indicates that mental health conditions have increased across all age groups due to the COVID-19 pandemic, with mental health issues increasing amongst children and adolescents in low income and emergency spaces (Holmes et al., 2020). The individual and collective impacts of the pandemic are likely to reflect previous conflicts and natural disasters (Kato et al., 2020). School closures and social isolation have also increased risks to the most vulnerable students (Pfefferbaum & North, 2020), resulting in increased rates of poverty (Van Lancker & Parolin, 2020), and violence against children (Baron et al., 2020; Griffith, 2020) and within families (Bradbury-Jones & Isham, 2020).

At the height of the pandemic, millions of children in LMIC lost access to learning, further impacting their mental health and wellbeing (Duan et al., 2020; Hou et al., 2020; UNSD, 2021; Wang et al., 2020; Xie et al., 2020). Recent research also demonstrates the short-term impacts of COVID-19 on child and adolescent mental health, and suggests older children are reporting higher rates of anxiety and depressive symptoms, which may impact their school engagement and performance (Sharma et al., 2021; Dix et al., 2022). The effects of COVID-19 have also compounded growing global inequalities, poverty, social-conflict, and environmental concern, placing unprecedented pressure on education systems to support the wellbeing and mental health of students and teachers (Van Der Zant & Dix, 2023).

Readiness for mental health promotion in LMIC schools

Mental health has been a focus of school improvement for several decades. For example, the WHO's Health Promoting School (HPS) initiative launched in 1995, which integrated aspects of mental health for bulling prevention. Yet, there is little evidence that schools have been able to implement this HPS approach. In fact, few programs have been found that implement and evaluate the HPS approach and in most cases, it is only used as a

curriculum/ social skills framework (Aldinger & Whitman, 2009). Decades after the implementation of HPS, in many LMIC, there are still low levels of awareness and high social stigma around students' mental health and psychosocial wellbeing (Henderson et al., 2013). The lack of reference materials and tools, including national guidelines, curricula and training materials, and protocols for assessment, planning, monitoring, and evaluation, also remains a barrier for the resource-poor countries (Aldinger & Whitman, 2009). This impacts on the readiness of schools and education sectors to prevent, promote, or respond to mental health needs amongst students.

In many countries, mental health treatment and resourcing also remains inaccessible due to high cost and unavailability. These issues are particularly prevalent within disadvantaged communities and LMIC (Pundir et al., 2020). In such contexts, communities, including schools, are often key sources of support for children and adolescents who do not have access to clinical services. Schools and educational settings can also play a key role in supporting early intervention by implementing school-based programs that focus on promoting social and emotional (SEL), wellbeing and resilience skills, as seen by much of the research literature from the high-income countries (Dix et al., 2020; Corcoran et al., 2018).

Communities have a high degree of influence on the effectiveness of interventions within education settings. Evidence emphasizes the role of family and community members in ensuring that mental health interventions have the desired impact in education communities (García-Carrión et al., 2019), and that these interventions are culturally appropriate and culturally grounded (Bloemraad & Terriquez, 2016; Puffer et al., 2016; Kia-Keating et al., 2017).

Previous systematic reviews

Globally, schools are increasingly focussed on developing students' psychosocial outcomes by implementing school-based wellbeing programs that help children and young people attain the skills they need to succeed academically and in life. This is reflected in the growing number of reviews (Bücker et al., 2018; Corcoran et al., 2018; Crede et al., 2015; Dix et al., 2020; Kirkcaldy et al., 2004; Mahoney et al., 2020; NWD, n.d.; OECD, 2017; Steinmayr et al., 2016; Suldo et al., 2008).

However, the majority of research has been focussed on programs suitable for Western, Educated, Industrialized, Rich and Democratic (WEIRD) countries which represent only 12% of the world's population (Arnett, 2008; UNICEF, 2022). To date, only one mega-map of mental health and wellbeing interventions in LMIC has been identified that includes 83 studies related to education, covering 24 studies (including reviews and evidence gap maps (EGMs)), which report some student-level outcomes such as enrolment, attendance, dropouts and truancy, learning and achievement, and social skills development (Saran et al., 2020).

An initial search identified several evidence reviews of school-based mental health and psychosocial wellbeing programs conducted in LMIC, summarised in Appendix 1 (see Table 5). This preliminary search was undertaken to ensure that sufficient evidence

would be available for a productive review, particularly with regard to achieving broad coverage across LMIC interventions from the Indo-Pacific region which are deemed to be 'promising', low cost and/or easily replicable.

Previous systematic reviews have suggested that evidence-based psychological intervention models from high-income countries could be adapted and used in LMIC, to address the mental health of children across different cultures, and often via non-specialist delivery models (Brown et al., 2017; Jordans et al., 2016; Knerr et al., 2013; Tol et al., 2011). While recent systematic reviews have also considered psychosocial interventions for child and youth mental health outcomes in LMIC, many of these reviews primarily focus on family and parenting interventions from LMIC (Britto et al., 2017; Healy et al., 2018; Knerr et al., 2013; Pedersen et al., 2019) and on psychosocial interventions for specific populations or vulnerable groups (Jordans et al., 2016; Hastings et al., 2012; Purgato et al., 2018; Tol et al., 2013).

Objectives of this review

Schools play a vital role in promoting student *wellbeing* – defined as 'a sustainable positive mood and attitude, health, resilience and satisfaction with self, relationships and experiences at school' (Noble & McGrath, 2012; Samie, 2021 p.20). General consensus holds that school-based wellbeing programs have the potential to help children and young people attain the psychosocial skills they need to succeed academically and in life (e.g., Mahoney et al., 2020). However, there is little clear evidence available on the effectiveness of such programs in LMIC. Previous reviews on wellbeing interventions are narrow in scope (e.g., Psaki et al., 2022; Pundir et al., 2020) or focus on high-income country contexts (Corcoran et al., 2018), and don't go beyond examining wellbeing-related outcomes to also consider improved academic outcomes (Sharma et al., 2022). This rapid review addresses these limitations.

Some recent studies have focused on the implementation and effectiveness of mental health interventions in LMIC. In a recent review commissioned by UNICEF, ACER researchers looked at remotely delivered mental health and psychosocial wellbeing programs in LMIC and Education in Emergencies (EiE) contexts (Dabrowski et al., 2022), and found that although there are many innovative programs being implemented in LMIC and EiE environments, very few interventions also considered academic outcomes, or provided an integrated focus on mental health and wellbeing as part of learning. Another systematic review and meta-analysis (Dix et al., 2020) identified school-based mental health and wellbeing initiatives that also focus on academic outcomes, but only included methodologically rigorous studies (i.e., Random Controlled Trials and Quasi Experimental Studies) primarily from the Global North (US, UK), with fewer from LMIC (Brazil, Bhutan, DR Congo, India, Mexico, Peru, and Tanzania).

These universal school-based interventions from LMIC mainly focus on improving social and emotional skills in classrooms through indirect modes – for example, through training programs for teachers that improved classroom climate, or provision of resources/tools to support students. During the preliminary screening phase of this

review (Dix et al., 2020), several other studies were identified as useful interventions from LMIC, but were excluded as they did not measure academic outcomes (e.g. literacy, numeracy). A few examples of excluded interventions were the *Learning to Think* program in China, the *Compassionate Heart Scholars Program* in North-western China, and the *Skills for Life* in Chile. However, for this study, such evidence is useful for identifying 'what works, where, why, and how'.

Accordingly, this Rapid Evidence Assessment (REA) into school-based interventions that support mental health and psychosocial wellbeing is in response to the limited research available in LMIC, where the need for such research is more important than ever (Inter-Agency Network for Education in Emergencies, 2016). This review seeks to understand the types and effectiveness of school-based interventions for students aged 5–19 years in LMIC that support mental health promotion and psychosocial wellbeing, and in turn influence academic readiness and student achievement.

The review also seeks to summarise the evidence for characteristics of effective interventions and provide an understanding of successful elements that schools and systems might consider when implementing health and wellbeing interventions in the LMIC. It showcases several innovative school-based mental health and wellbeing initiatives from countries in the Indo-Pacific. These serve as examples of how school-based programs can support the integration of mental health and wellbeing into broader school improvement agendas. A focus is also given to flexible delivery in response to the disruption in the delivery of programs due to COVID-19.

By doing so, the review also considers the following areas of investigation:

- What existing interventions support students' mental health and psychosocial wellbeing in the school communities in LMIC?
- Are any of these interventions carried out in the Indo-Pacific LMIC and how have these been successfully implemented?
- What can we learn from the interventions in High Income Countries (HIC) and how can we transfer relevant learnings to education systems in LMIC?
- How can schools in LMIC work with the resources they already have?

Method

A Rapid Evidence Assessment (REA), also sometimes referred to as a Rapid Review, is "*a more structured and rigorous search and quality assessment of the evidence than a literature review but are not as exhaustive as a systematic review*" (Department for International Development, 2019).

Following the approach recommended by Barends et al. (2017), as outlined in Figure 3, this REA seeks to address the overarching research question: What are the types and effectiveness of school-based interventions for students in LMIC that support mental health promotion and psychosocial wellbeing, and in turn influence academic readiness and student academic achievement?

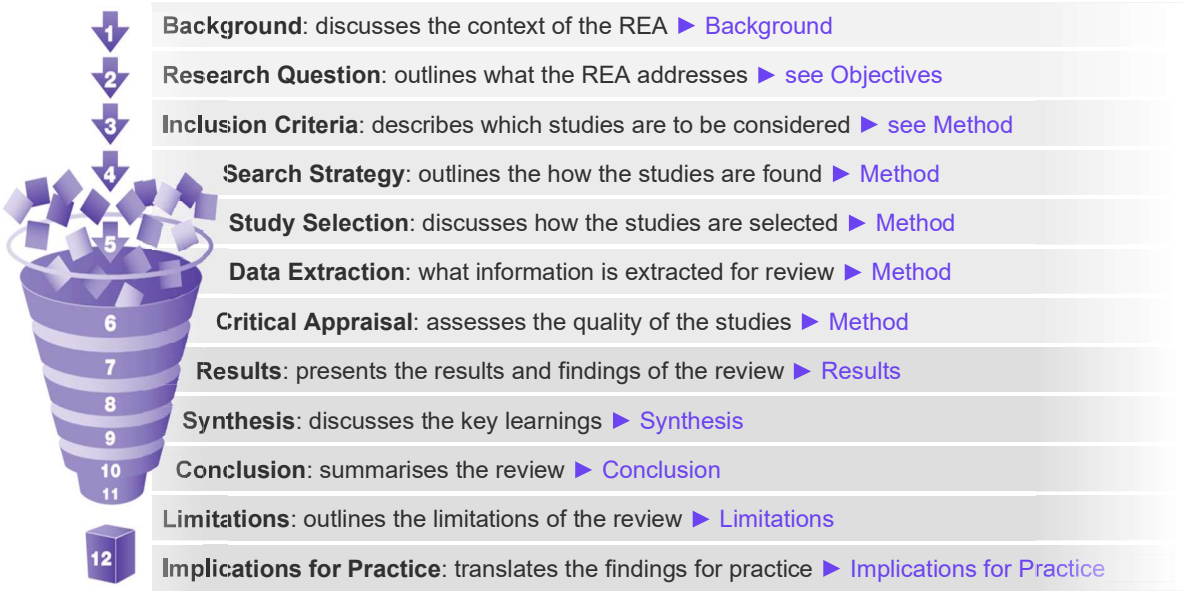


Figure 3: The Rapid Evidence Assessment process used in this report

This REA also builds on the approach used by Dix et al. (2020) which used the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)[1] statement checklist (Moher et al., 2009) to inform the content of this review.

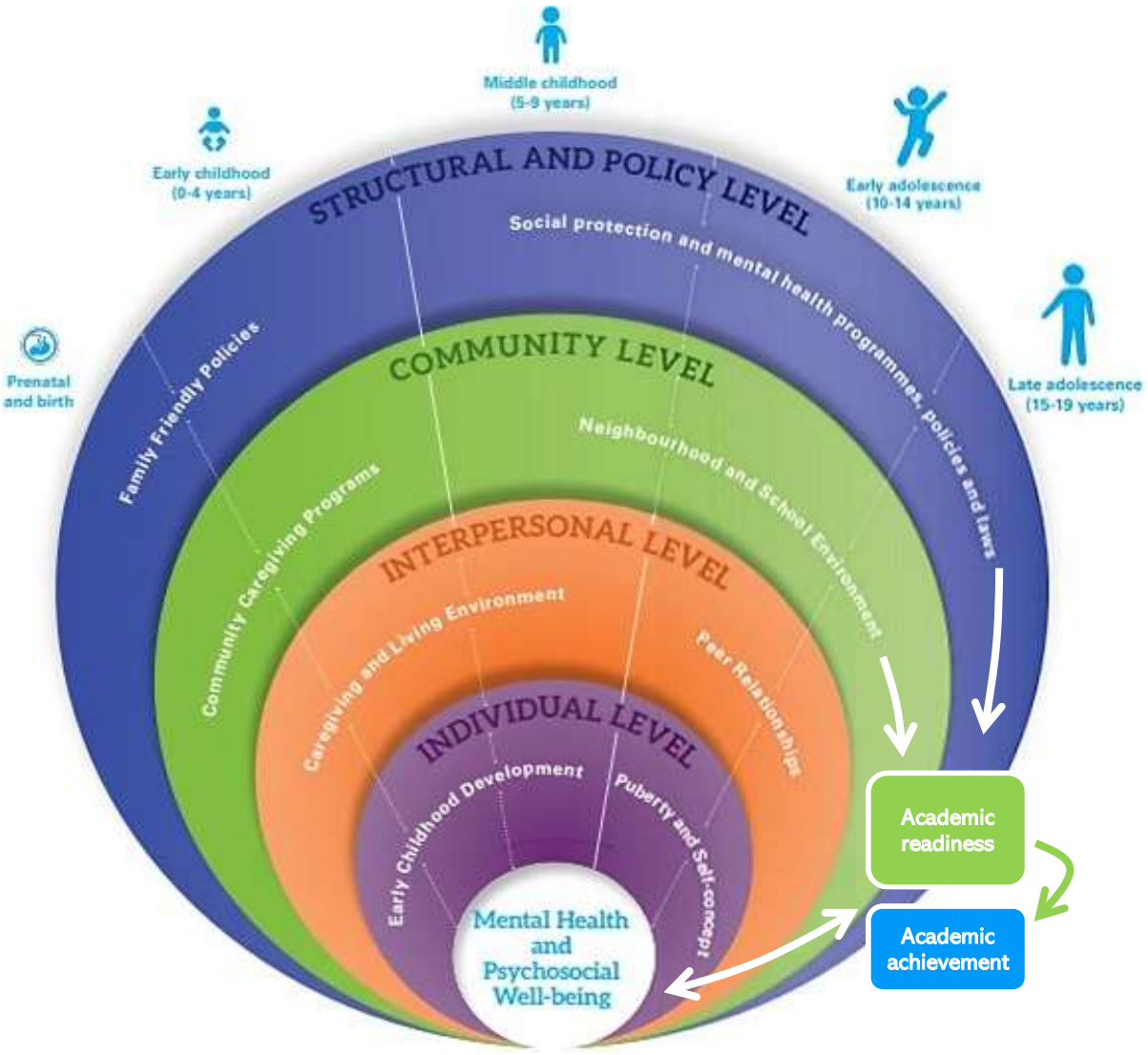
The theoretical framework

Wellbeing, academic readiness and academic achievement are broadly seen as fundamental to positive psychological functioning and are therefore considered important indicators of well-performing education systems (Suldo et al., 2006). For example, in high-income contexts such as in Australia and Canada, the link between wellbeing and academic performance is annually monitored through national/regional

[1] The PRISMA, published in 2009 by Moher and colleagues, was developed to ensure consistent and transparent reporting by systematic reviewers about a review search process, with clear steps outlining what the authors did, why, and what they found.

student assessments and surveys, such as the Victorian Child and Adolescent Monitoring System (VCAMS) and the Human Early Learning Partnership (HELP). Moreover, international programs such as the OECD Teaching and Learning International Study (TALIS) aim to help countries better understand how to create positive and supportive learning environments that promote student success and wellbeing. This is important because research has shown that student wellbeing is a key factor in academic achievement, and that promoting student wellbeing is critical for creating inclusive and equitable education systems.

According to the *Child and Adolescent Mental Health and Psychosocial Wellbeing Framework* (UNICEF, 2022: see Figure 4), key age-specific risk and protective factors work to support mental health outcomes in children and adolescents (UNICEF, 2022; Kieling et al., 2011). The framework forms the theoretical underpinning for this REA.



(Source: adapted from UNICEF, 2022, p.5)

Figure 4: UNICEF's Child and Adolescent Mental Health and Psychosocial Wellbeing Framework

The framework aims to focus on the age groups between five to 19 years which includes the middle childhood, early and late adolescence years in young person's life. It suggests child development is influenced by many factors at the personal, inter-personal, community and structural levels. Factors such as parenting style, caregiver mental health, or experiencing trauma, can shape a child's development (Kieling et al., 2011).

Other key factors include peer interactions (both online and offline relationships) and relationships with teachers, community and family members (UNICEF, 2022; Knerr et al., 2013). During the early adolescence (10–14 years), unique mental health challenges may emerge, intensified by physiological and emotional transitions, which make factors such as the individual, home, school and community relationships integral to an adolescent's mental health and psychosocial wellbeing (UNICEF, 2022). During this time, relationships and social roles take importance, and thus school environments and social networks become vital, which can act as protective factors. In late adolescence (15–19 years), social norms and behaviour, gender norms and roles, and independence take prominence, which relate to physiological and emotional transitions, as well as self-image, identity issues and risk-taking behaviours (such as substance use and sexual activity) that vary across cultures and contexts.

Additionally, wellbeing is also influenced by cross-cutting factors that operate at the individual, interpersonal, community, societal, and policy or structural levels, such as "gender and social norms; school environment; caregiver mental health; living with a disability; socioeconomic status; physical, sexual and psychological and emotional violence; experiencing humanitarian and public health crises; and structural and policy environments such as national policies, programs, resources, and institutional and legal frameworks for coordination and accountability mechanisms" (UNICEF, 2022, p.7). Many of these factors are widespread across some LMIC due to political conflict and instability, and ongoing economic and social disadvantage (Healy et al., 2018).

The Child and Adolescent Mental Health and Psychosocial wellbeing framework (UNICEF, 2022) has been extended to include how the system and schooling environments and individual student wellbeing shape a student's academic readiness (e.g. executive function, self-regulation, school engagement) and in turn, their educational outcomes, like academic achievement.

Inclusion criteria

Undertaking a global review of interventions that support mental health and psychosocial wellbeing of students with a focus on interventions from Indo-Pacific LMIC is timely and important, given the growing concern about mental health arising from COVID-19 and other demographic risk factors. In addition to reviewing relevant programs across all LMIC, this REA also includes case examples of successful programs from the Indo-Pacific region, in response to one of DFAT's key development policies, to help develop "a stable, prosperous, resilient Indo-Pacific in the wake of COVID-19" (DFAT, 2022, p.15).

The following inclusion criteria were used to identify eligible studies:

Participants: Samples needed to consist of students in LMIC schooling contexts between five and 19 years of age. This includes children with learning difficulties or disabilities.

Interventions: To be eligible for inclusion, an intervention needed to be a framework or program used in school, including whole-school universal or targeted approaches, for promoting student mental health and wellbeing. It could be delivered by the classroom teacher or a program specialist. The interventions were not specific to health or academic attainment. Interventions were also included that focused on students in mainstream schools with a disability or additional learning needs. Interventions that were solely family, out-of-school hours, preschool, clinical, or pharmacologically based were excluded from the review. Interventions that were education-system-level (e.g., Charter schools) were also excluded.

Comparison group design: The comparison groups in experimental and quasi-experimental studies included wait-list control groups or treatment-as-usual groups. Studies from LMIC with a pre-post or longitudinal design that did not have a control group were also included to increase the number of eligible studies. The minimum requirement of a quasi-experimental quantitative design was used as an initial indication of research rigor and to support a meta-analysis as part of the REA.

Outcomes: The outcomes were broadly grouped into three categories:

- academic achievement (e.g., numeracy test, literacy test, GPA);
- academic readiness (e.g., self-regulation, executive function, academic self-esteem) – the interface between academic and wellbeing outcomes; and
- wellbeing outcomes (e.g., anxiety, mental health, social-emotional skills).

Studies that did not report wellbeing outcomes and at least one indicator of academic readiness or achievement were excluded from the review. Student outcomes were measured, where possible, using valid and reliable approaches (e.g., validated scales, screening instruments, behavioural checklists) in the school setting. Self-reported outcomes were prioritised over teacher or parent reports.

Publication: All studies published between January 2003 to January 2023 in the English language and in peer-reviewed journals, commissioned reports, or approved Masters or Doctoral theses were considered. Studies were also sourced from any published review (global or focused on LMIC) that collated evidence on school-based wellbeing interventions, including the studies undertaken in LMIC from the Dix et al. (2020) review. To contrast any differences in the quality of studies, a subset of 53 High-Income-Countries (HIC) studies used in the Dix et al. (2020) review, were also included in the meta-analysis.

Search strategy and study selection

To augment the LMIC's studies already identified in the Dix et al. (2020) review, this REA undertook a search of the databases and grey literature presented in Figure 5. Additional articles were obtained through a hand search strategy which included scanning the reference lists of key articles and related systematic reviews (see Appendix 1). The grey literature in Google Scholar was also searched for published papers focused on LMIC.

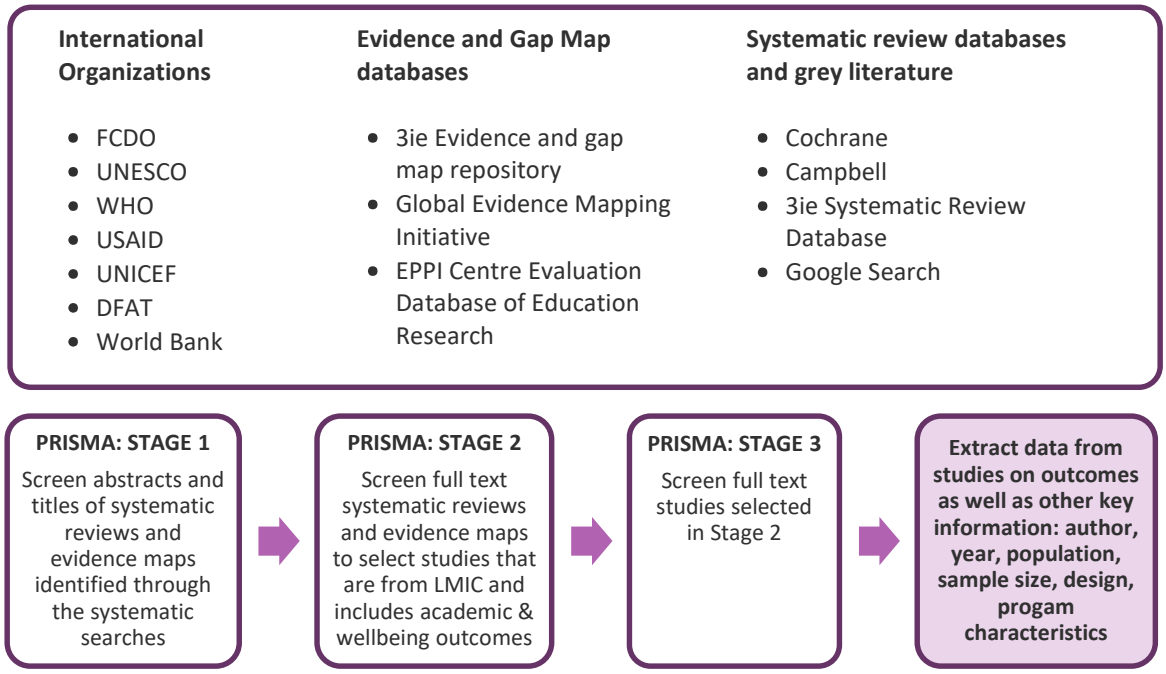


Figure 5: Sources used in the search strategy and PRISMA stages

A total of 92 studies in LMIC were identified by the rapid search strategy. Once duplicates were removed (n = 9), the titles and abstracts of 83 studies were screened for relevance by the reviewers who then excluded non-relevant titles (n = 36). The full texts of the remaining studies (n = 47) were then reviewed. Reviewers were provided with a set of inclusion and exclusion criteria against which to assess each study and met regularly to ensure common understanding and to discuss studies that were unclear. The reasons for exclusion during the screening and eligibility process were also recorded. Appendix 2 Figure 17 presents the PRISMA flow diagram which shows the four-phase selection process of LMIC's studies based on the criteria and strategies outlined in this chapter.

Data extraction and analysis

Data and information were extracted for 34 interventions (from 32 included articles) based on the Cochrane Review Group's Data Extraction Template for Included Studies (2016, Version 1.8) for experimental and quasi-experimental studies. This involved reading each paper several times and completing a row in the extraction table with data

entered under standard column headings including the name of the first author, year of the publication, groups, sample attributes, intervention, and outcomes. Each article had data extracted for at least two outcomes – one academic and one wellbeing-related. Note that one included article[2] (Adler 2016) reported three separate studies. From the 34 included LMIC's studies, 181 outcomes were extracted (33 Achievement, 59 Readiness and 89 Wellbeing outcomes).

In addition, 56 studies in HIC from the Dix et al. (2020) review were also included in this REA for comparative analysis. From these 56 HIC's studies, 300 outcomes were extracted (90 Academic achievement, 61 Academic readiness and 149 Wellbeing outcomes).

The effect size estimate used was Hedges's *g* (1988) – the adjusted standardised difference between means of the intervention and the comparison group. As a rule of thumb, a Hedge's g of 0.2 was interpreted as a *small* effect size, 0.5 as a *medium* effect size and 0.8 as a *large* effect size. Most studies did not contain information that allowed for the direct extraction of the effect size estimate. Various statistics reported in these studies were converted to Hedges's *g* using the Comprehensive Meta-Analysis (CMA) Version 4.0 program (Borenstein et al., 2014). Due to the high heterogeneity (variation) in study outcomes between studies, a random effects approach was used. Effect directions were defined in relation to the meaning of each outcome category measured.

Accordingly, outcomes that were desirable to increase (e.g., social-emotional skills or academic achievement) had a positive effect direction when increased, while outcomes that were desirable to decrease (e.g., anxiety or conduct problems) were reversed to a positive effect direction when decreased. For studies reporting more than one academic or wellbeing outcome (most), effects of the specific outcomes were averaged to obtain a single wellbeing, readiness or achievement estimate for the given study using the CMA program. Statistical tests were two-tailed and an alpha level of < 0.05 was used to indicate statistical significance. Appendix 5 summarises the outcomes for each study in three forest plots.

Critical appraisal

Each study was assessed for the risk of bias using Cochrane's tool for assessing risk of bias in randomised trials (Higgins et al., 2011). The tool includes the following domains: random sequence generation, allocation concealment, blinding of participants and personnel, blinding of outcome assessment, incomplete outcome data, selective reporting, and other sources of bias. Each domain was rated for risk of bias as Low, Unclear, or High risk. Funnel plots were used to visually explore publication bias which arises from the likelihood that studies reporting relatively large treatment effects tend to

[2] Referencing style note: LMIC studies included in the meta-analysis are referenced as (First-author Date), rather than APA style, to distinguish them from other references in this report.

be published over studies that report modest or trivial treatment effects, potentially impacting conclusions drawn.

Full details of the risk of bias assessment for the 34 experimental and quasi-experimental studies in LMIC are provided in Appendix 4 and summarised in Figure 6. All LMIC's studies had multiple domains at high risk of bias and some studies did not have a control group. Among the randomised controlled trials (39%), the main issues were a high risk of bias due to lack of blinding of participants and study personnel and lack of blinding of outcome assessment. Information about random sequence generation and allocation concealment was unclear for most trials. Figure 6 presents a summary of the proportion of LMIC's studies that were at low, unclear, and high bias for each category.

Across the matrix of categories and studies (See Figure 6 and Table 8 in Appendix 4), 61% of categories were rated 'unclear' or 'high' bias if they were a quasi-experimental design, compared to only 30% of categories if they were a RCT design. It suggests that quasi-experimental studies are at much greater risk of bias compared to RCT studies within LMIC studies.

Moreover, this bias is further demonstrated when compared to similar HIC studies. Additional analysis in Appendix 4 Figure 19, compares studies by research design, and shows that LMIC studies do differ in outcomes, whereas HIC studies do not. In the LMIC context, quasi-experimental designs may be over-estimating the effectiveness of intervention when compared to studies that involve an RCT design.

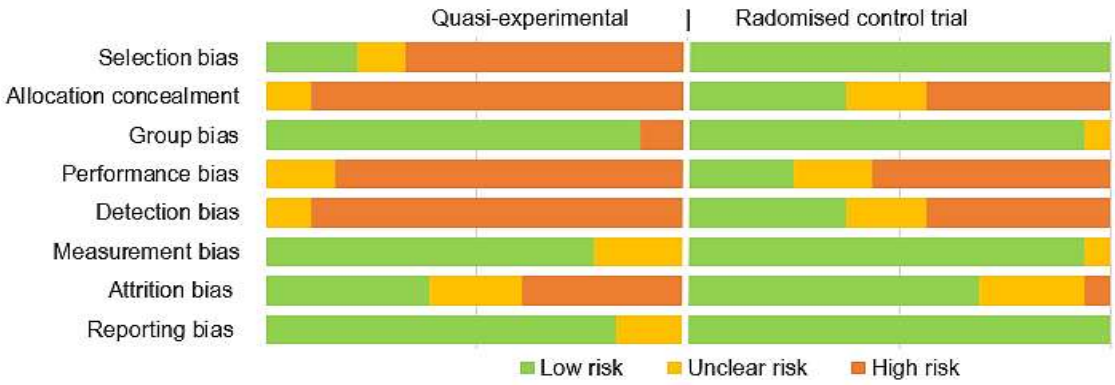


Figure 6: Risk of bias categories presented as percentages across all 34 LMIC's studies

Results

This section describes the evidence analysed for this REA and presents findings about the effectiveness of school-based universal and targeted interventions that are aimed at supporting mental health and psychosocial wellbeing.

Characteristics of LMIC studies and outcomes measured

Design: The characteristics of the included LMIC's studies are presented in Appendix 3 Table 6. Of the 34 studies, 14 were randomised control trials, 15 were quasi-experimental control group comparison, and five were quasi-experimental pre-post design without a control group.

Countries: Most studies were carried out in India (nine studies), Turkey (five studies) and Iran (three studies). The Democratic Republic of the Congo, Brazil, China, and Mexico each had two studies, while Bhutan, Chile, Jamaica, Peru, Sri Lanka, Tanzania, Thailand, Tunisia, and Uganda were each represented by one study.

Participants: The number of participants in each study ranged from one school with 24 students in the Turkey (Diken 2010) through to 694 schools with 694,153 students in Peru (Adler 2016). In total, this review and meta-analyses are based on 802,145 students. Study participants ranged from an all-girl Iranian sample (Paeezy 2010) to 87% boys (Diken 2010), with the total sample being 51% boys overall. Students were mainly aged between five to 18 years in all schooling grade-levels: five studies in junior primary or pre-school, 12 studies in upper primary school, 19 studies in secondary school.

Types of interventions: In line with other Rapid Evidence Assessments and meta-analyses of this kind, the 34 wellbeing-related interventions used in LMIC were diverse in nature. For example, 39% programs were categorised as targeted early-intervention programs for at-risk students, while 61% were universal preventative interventions delivered at the classroom or whole-school level.

To facilitate the synthesis of results, the intension or approach of each program was reviewed and thematically grouped into three broad types:

- Improving behavioural cognitive skills: 28% of studies
- Improving social-emotional skills: 36% of studies
- Encouraging physical activity and relaxation: 36% of studies

What is noticeably missing from the nature of selected LMIC's interventions, compared to the HIC, are interventions that involve mentoring approaches, and those that focus on preventing harm from tobacco, alcohol, and drugs.

Types of outcomes: The outcome measures used to assess evidence of impact were as diverse as the interventions themselves and needed to be categorised in order to facilitate the comparison of studies (Zubrick et al., 2000; Svane et al., 2019). From the

181 student outcomes that were extracted from the 34 included LMIC's studies, three categories of outcome emerged. Academic achievement and academic readiness focused on academic-related performance, while student wellbeing focused on a student's overall mental health and wellbeing. While these concepts are distinct, they are also interrelated, as student wellbeing can impact academic readiness, and in turn their academic achievement.

- **Academic achievement** (64% of studies): Refers to the actual level of academic performance a student has achieved, such as GPA, grades, numeracy or literacy test scores, and other academic measures. It is a measure of a student's success in meeting academic standards and expectations.
- **Academic readiness** (64% of studies): Refers to a student's level of preparedness to engage in academic activities and achieve academic success. It encompasses a range of cognitive and non-cognitive factors, including working memory, executive function, self-regulation, perseverance, learning skills, flexible thinking, academic self-esteem, and academic competence. It is an indicator of a student's potential for success rather than a measure of their current performance.
- **Student wellbeing** (92% of studies): Refers to a student's overall state of physical, emotional, and mental health. It can encompass a range of factors, such as anxiety, psychological wellbeing, connectedness, exercise, social connections, prosocial behaviour, emotional regulation, and stress management. Student wellbeing is important because it can impact a student's ability to learn, engage in academic activities, and achieve academic success.

The results in this chapter present the meta-analyses of each of these outcomes organised by the types of intervention, followed by a comparison between LMIC and HIC, and an exploration of the moderators on academic and wellbeing outcomes in LMIC.

Improving social-emotional skills

Social-emotional skills: These programs focus on the extent to which students feel included, respected, accepted, and encouraged by others in school. According to Hattie (2017), social skills programs are typical broad school-based curricula designed to teach students to "appropriately interact and communicate effectively with their peers and teachers and develops respect for self and respect for others". Social-emotional skills are also vital for learning as these shape children's developing brain, particularly the executive functions (UNICEF, 2020). Research has shown that a positive relationship to school community can shape a student's emotional, behavioural, and cognitive engagement with schooling, and influence academic outcomes (UNICEF, 2020).

Promoting student social-emotional skills were evaluated by 12 of the LMIC's studies. The nature of these diverse interventions is summarised in Table 1. They included universal wellbeing curriculum (Adler 2016; McMullen 2018; Shinde 2018) implemented in Mexico, Peru and Bhutan, Uganda, and India, as well as targeted interventions in Tanzania, China, India and Turkey for 'at risk' children in crisis or conflict (Berger 2018; Harrison 2017; Singhal 2018; Wolmer 2005).

Figure 7 shows that, when compared to the control groups, social-emotional interventions had small positive effects on student **wellbeing** (g = 0.368) and **academic readiness** (g = 0.412), but less effect on **academic achievement** (g = 0.246).

The strong focus of these social-emotional interventions on improving the mental health and psychosocial aspects of a student are reflected in the stronger academic readiness and wellbeing outcomes than academic achievement.

Social-emotional skills	Hedges' g	Standard error	Lower limit	Upper limit	p-Value	Total Sample	No of Studies
Wellbeing	0.368	0.056	0.258	0.478	0.000	172612	12
Academic readiness	0.412	0.094	0.228	0.596	0.000	23048	8
Academic achievement	0.246	0.047	0.155	0.338	0.000	156702	9

CMA analysis based on a random effects approach due to high heterogeneity across studies

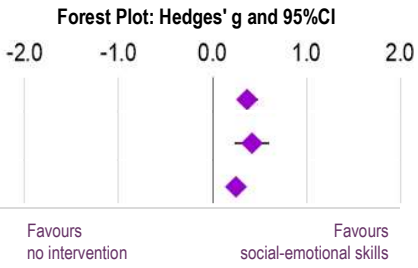


Figure 7: Effects of LMIC interventions that improve social-emotional skills

Table 1: Summary of social-emotional interventions in LMIC

Audience	Brief description of social-emotional intervention	Country	Study
Area: Building coping skills			
Secondary individual or small-group settings targeting specific cohorts of at-risk students (e.g. Parental HIV/AIDS; depression; trauma)	The ChildCARE (Child component) intervention can involve three levels: Child, caregiver, and community. At the child level, facilitators with training in psychology or education led ten sessions (20hrs) of small peer-group activities designed to promote the development of personal resilience characteristics for children affected by parental HIV/AIDS, including positive thinking, emotional regulation, coping skills, problem solving, support seeking, positive future orientation, and enhanced self-esteem.	China	Harrison 2017
	Coping skills program: The intervention taught the participants ways to reduce depressive symptom severity and frequency, negative thinking, and academic stress, and increase in social problem solving and coping skills.	India	Singhal 2018
	School Reactivation Program: This intervention focused on dealing with symptomatic decrease in children exposed to a major disaster (e.g. earthquake) over the course of three years in the three domains assessed: post trauma, grief, and dissociation. It was designed as a school-based teacher-mediated intervention.	Turkey	Wolmer 2005
Area: Living in crisis and conflict			
Targeted and universal approaches for primary school classrooms in regions experiencing crisis and conflict, or living in chronic adversity	The ERSAE-Stress-Prosocial (ESPS): is targeted program that includes stress-reduction interventions and prosocial interventions to strengthen perspective-taking, empathy training, mindfulness, and compassion-cultivating practices). Teachers delivered the course content of the original 16 session manual in 2 weekly 45min sessions, each containing a warm-up exercise, experimental work, psycho-educational knowledge, a contemplative practice, a learned skill, and homework assignments.	Tanzania	Berger 2018
	Learning in a Healing Classroom: These universal teacher professional development interventions aimed to improve primary school-aged children's social-emotional development and learning skills by providing integrated resources supporting teachers through training and coaching.	D. Rep. Congo	Aber 2017 Torrente 2019
Area: Wellbeing curriculum			
Universal, whole-school approaches in secondary school classrooms	These interventions focus on non-academic "life skills" for Grade 7-12. Areas covered include goal setting (behaviour); problem solving; and social skills development. Teachers complete training on the 'life skills' and subsequently delivered program in their classrooms. Programs are called: 'Educación para el Bienestar' in Mexico, 'Escuelas Amigas' in Peru, the 'GNH Life Skills' program in Bhutan, or the 'Living Well' program in Uganda.	Mexico	Adler 2016b
		Bhutan	Adler 2016l
		Peru	Adler 2016f
		Uganda	McMullen 2018
	The SEHER (Strengthening Evidence base on scHool-based intErventions for pRomoting) adolescent health program designed a school health promotion intervention which aims to improve school climate and health-promoting behaviours. SEHER is inspired by the WHO's Health Promoting Schools (HPS) framework.	India	Shinde 2018
	RULER: The intervention provided 20 45-min lessons at each secondary grade level. Lessons are based on themes that are salient during adolescence, including identity development, building healthy habits (e.g., eating, sleeping, exercising), stress management, handling peer pressure, and setting and achieving goals. This is a well-established SEL program, used in HIC contexts.	Mexico	Baumsteiger 2022

Improving behavioural cognitive skills

Behavioural cognitive skills: Such programs are designed to modify student behaviour in the classroom by developing prosocial skills and reduce problem behaviours like aggression. Hattie (2017) found that behavioural and cognitive programs had a small to moderate influence on student achievement. They are generally founded on the notion that cognitive and behavioural deficits are a learned behaviour rather than inherent trait, and that they can be unlearned or replaced in a nurturing environment. This is in line with the Behavioural Drivers Model (UNICEF, 2011). Cognitive behavioural therapy interventions have been reported to be mildly effective in reducing depression and moderately effective in reducing anxiety symptoms (Mychailyszyn et al., 2012). The general aim of many behavioural cognitive programs is to learn and develop practical self-help strategies that replace unhelpful thoughts and behaviours and to strengthen self-regulation.

Table 2 summarises the interventions from nine of the LMIC focussed on promoting student behavioural and cognitive skills. This group of interventions were focused on building metacognitive awareness, resiliency, self-regulation, executive function, learning skills and reducing test anxiety and problem behaviour. Most interventions used a targeted approach to support 'at risk' students (Diken 2010; Guzmán 2015; Kaesornsamut 2012; Ozan 2018; Tol 2012) or students with a learning disability (Karbasdehi 2019; Lan 2018). Two interventions used a universal approach to reducing conduct problems or strengthen assertiveness and self-regulation (Baker-Henningham 2012; Paeezy 2010).

Figure 8 shows that in comparison to the control groups, behavioural cognitive interventions had a small positive effect on student **wellbeing** (g = 0.466) and a medium positive effect on **academic readiness** (g = 0.569). However, while the effect on student **academic achievement** (g = 1.010) was large in comparison the control conditions, the analysis was based on four quasi-experimental studies and a relatively small sample (n = 208) and interpretation should be treated with caution.

Given the cognitive focus of these interventions, it is not surprising to see that they were more effective at improving academic outcomes, than wellbeing.

Behavioural cognitive skills	Hedges' g	Standard error	Lower limit	Upper limit	p-Value	Total Sample	No of Studies
Wellbeing	0.466	0.122	0.227	0.704	0.000	4918	9
Academic readiness	0.569	0.151	0.273	0.865	0.000	4823	8
Academic achievement	1.010	0.315	0.392	1.628	0.001	208	4

CMA analysis based on a random effects approach due to high heterogeneity across studies

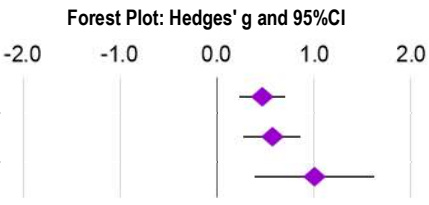


Figure 8: Effects of interventions that improve behavioural cognitive skills

Table 2: Summary of behavioural cognitive interventions in LMIC

Audience	Brief description of behavioural cognitive intervention	Country	Study
Area: Self-regulation and assertiveness			
Targeted approach for primary student with Dyscalculia	Self-regulation empowerment: This is a targeted 12-session program to develop self-regulation strategies which allow students to do homework and everyday activities by planning, organizing, and self-monitoring. Students learned about reconsidering their multiple failures with self-regulation strategies and ultimately their active learning will improve. The program training aims to improve neurocognitive and social skills in students with dyscalculia.	Iran	Karbasdehi 2019
Universal program for secondary students	Assertiveness training: The intervention group received assertiveness training through role-playing in 10 sessions of an hour and a half each. The assertiveness skills consisted of asking, saying "yes", saying "no", showing positive affection, showing negative affection and effective criticism.	Iran	Paeezy 2010
Targeted classroom secondary school program to reduce negative self-talk and strengthen successful approaches to learning	Belonging against Negative Thinking and Depression (BAND): The intervention group were taught cognitive behavioural and interpersonal approaches to develop interpersonal skills and modify the adolescent participants' negative thoughts.	Thailand	Kaesornsamut 2012
	Formative Assessment training: The intervention group learned about 'Formative Assessment in social studies' including, formative assessment practices. Formative assessment has four main elements: (i) explaining learning objectives and success criteria; (ii) increasing the quality of inquiry/ dialogue; (iii) increasing the quality of marking/ feedback/ recordkeeping; and (iv) using self and peer assessment. The rationale behind this intervention was that formative assessment practices can increase students' academic achievement and attitudes toward the class significantly and therefore improve their self-regulation skills.	Turkey	Ozan 2018
Area: Psychosocial behaviour in the early years			
Targeted program using CBT for small groups of at-risk students with poor psychosocial functioning	Skills for Life (SFL): This is a large-scale targeted mental health intervention for the early years Grade 1-3 students. Students identified as being at-risk of poor psychosocial functioning in Grade 1 were referred to a standardised 10-session preventive intervention in Grade 2. The SFL workshops were made up of 15 sessions: 10 for the student, 3 for the parent, and 2 for the teacher. Student workshop sessions were led by psychologists from the program. Sessions took place during the school day, in groups of 6-10 students, and lasted 1.5-2 hours each. The intervention followed a CBT approach.	Chile	Guzmán 2015
Targeted school/ home program for students with anti-social behaviours	First Step to Success (FSS): The intervention worked with at-risk kindergartners through to Grader 2 who showed noticeable signs of antisocial behaviour patterns. The modules included - First Step Screening, First Step School Intervention Program: CLASS (Contingencies for Learning Academic and Social Skills), and First Step Home Intervention Program homeBase.	Turkey	Diken 2010

Audience	Brief description of behavioural cognitive intervention	Country	Study
Universal pre-school classroom program	Incredible Years Teacher Training: This universal pre-school-based intervention on child conduct problems and social skills at school and at home applied collaborative and experiential learning, individual goal setting and self-monitoring, for building teachers' self-efficacy, with a focus on teachers' cognitions, behaviour and emotions, and emphasis on teachers' ability to generalise the skills learned. Tailored to the Jamaican pre-school context.	Jamaica	Baker-Henningham 2012
Area: Psychosocial functioning			
Targeted primary school program for at risk students with ADHD	Social skill training (SST) and Group executive function training (GEFT): The intervention group attended at least 11 of 12 sessions of either Social Skill Training (SST) or Group Executive Function Training (GEFT). The intervention was led by a licensed clinical child psychologist, and the therapists were doctoral candidates of clinical and school psychological fields. The therapists were trained on the use of the manual for SST and GEFT via role-play and modelling. The computerized EF training covered several modules: inhibition, working memory, flexibility, and plan. Group training also covered EF elements and EF Meta-cognition.	China	Lan 2018
Targeted CBT for primary students with PTSD in crisis, conflict or civil war	Mental health PTSD intervention: The intervention included cognitive behavioural techniques (for e.g., psychoeducation, coping and exposure types, games, movement, and dance). Each session was divided into four parts, starting, and ending with structured movement, songs, and dance with the use of a "parachute" (i.e., large circular coloured fabric). The second part was based on a "central activity" focused on the main theme of that week (e.g., a drama exercise to identify social supports in the environment, or drawing of traumatic events), and the third part was a cooperative game (i.e., a game in which all children participated to promote group cohesion).	Sri Lanka	Tol 2012

Encouraging physical activity and relaxation

Physical activity and relaxation: In an educational context, Hattie (2017) broadly described exercise and relaxation programs as those involving physical movement and meditative activities, usually aimed to reduce stress levels or maintain focus on tasks. In the LMIC, these tend to involve yoga or mindfulness meditation. A recent UNICEF report suggest that 'relaxing' (and its proxy concepts, such as mindfulness, meditation, etc.) are considered a core capacity of the Learning for Wellbeing Foundation's (L4WB) theoretical framework, which focuses on overall child development (ages 0–18) (Cunsolo et al., 2021). Research has found that such programs can have a small effect on student academic achievement.

Encouraging physical activity, exercise and relaxation involved 13 of the LMIC's studies, summarised in Table 3. Yoga-based wellbeing was a popular universal intervention, reported in six Indian studies (Bhardwaj 2013; Bhardwaj 2017; Gulati 2018; Sinha 2021a; Sinha 2021b; Telles 2013) and in one Tunisia study (Jarraya 2019). Three of the interventions were focused on physical activity (Bakir 2017; Barboza 2021; Çalik 2018), while the other interventions involved mediation (Anusuya 2021; Kiani 2017) or massage therapy (Gonçalves 2017).

Figure 9 shows that, compared to the control groups, physical activity and relaxation interventions had small positive effects on student **wellbeing** (g = 0.491), **academic readiness** (g = 0.296) and on student **academic achievement** (g = 0.388).

Interestingly, physical activity and relaxation techniques had its strongest benefits on student wellbeing and academic achievement.

Physical activity & relaxation	Hedges' g	Standard error	Lower limit	Upper limit	p-Value	Total Sample	No of Studies
Wellbeing	0.491	0.115	0.266	0.716	0.000	1163	12
Academic readiness	0.296	0.086	0.127	0.465	0.001	367	7
Academic achievement	0.388	0.076	0.240	0.536	0.000	1100	9

CMA analysis based on a random effects approach due to high heterogeneity across studies

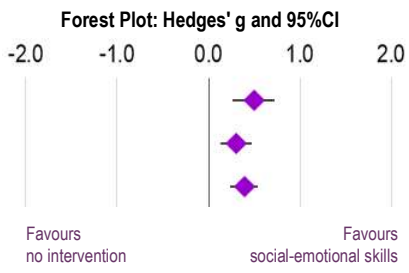


Figure 9: Effects of interventions that encourage physical activity, exercise and relaxation

Table 3: Summary of physical activity and relaxation interventions in LMIC

Audience	Brief description of physical/relaxation intervention	Country	Study
Area: Yoga			
Universal approach in primary and secondary classroom settings	The Yoga interventions mainly involved breathing techniques, physical postures, and relaxation practices. Most of the practice sessions were short to moderate in length and the duration varied across the different interventions, from a week to 3 months. While some interventions were supported by classroom teachers, some of the more complex sessions involved yoga instructors.	India	Bhardwaj 2013 Bhardwaj 2017 Gulati 2018 Sinha 2021a Sinha 2021b Telles 2013
		Tunisia	Jarraya 2019
Area: Massage and Storytelling			
Students in pairs in primary schools	The interventions consisted of a role-playing activity which included massage (performed by students in pairs), or a storytelling activity which involved choosing from 15 books covering themes of friendship, family, reflecting about relationships, expressing feelings, respecting differences, working cooperatively, imagination and creativity, health, empathy, environment, culture, science, philosophy, history, and geography.	Brazil	Gonçalves 2017
Area: Mindfulness meditation			
Secondary small-group settings using universal approaches or targeted for at risk students with elevated ADHD	Mindfulness meditation training used to teach about executive function and improve emotion dysregulation.	Iran	Kiani 2017
	Meditative approach through Mind Sound Resonance Technique (MSRT), provided by an institutionally trained yoga therapist for 30 min every day for two weeks at school.	India	Anusuya 2021
Area: Physical education and sports			
Primary and secondary classrooms, universal and targeted approaches	These interventions comprised of regular and scheduled sports or physical activities. Most interventions were universal and took place a few times a week and varied in length and duration. Çalik et al 2018 was a targeted, structured program that complied with a sport-based curriculum designed by the International Association of Athletics Federations (IAAF).	Brazil	Barboza 2021
		Turkey	Bakir 2017 Çalik 2018

Effects of intervention characteristics in LMIC

To better understand under what conditions interventions might be more effective in LMIC, several characteristics were identified that considered whether the school setting, the duration of the program or using a targeted or universal approach had any effect on student outcomes.

School setting

All interventions were categorised into the following levels of schooling: Primary schools (47% of studies), which included pre-school programs, and Secondary schools (53% of studies). For the small number of studies that included students across two settings, the study was allocated to the main cohort.

Figure 10 shows the random effects meta-analysis of the academic and wellbeing outcomes by setting type, comparing control and treatment groups across all LMIC's interventions. Secondary school interventions in LMIC tended to have a larger positive effect on wellbeing outcomes (g = 0.421) and academic achievement (g = 0.377), compared to primary school interventions (wellbeing g = 0.366; achievement g = 0.264). However, the interventions in primary and secondary school settings were found to equally support academic readiness to a larger effect (g = 0.473), compared to similar students in the control groups.

Setting	Hedges' g	Standard error	Lower limit	Upper limit	p-Value	Total Sample	No of Studies
Wellbeing							
Primary	0.336	0.064	0.211	0.460	0.000	18086	15
Secondary	0.421	0.051	0.322	0.521	0.000	160607	18
Academic readiness							
Primary	0.473	0.131	0.216	0.729	0.000	15127	13
Secondary	0.466	0.092	0.286	0.647	0.000	13111	10
Academic achievement							
Primary	0.264	0.075	0.117	0.410	0.000	8194	10
Secondary	0.377	0.050	0.280	0.475	0.000	149816	12

CMA analysis based on a random effects approach due to high heterogeneity across studies

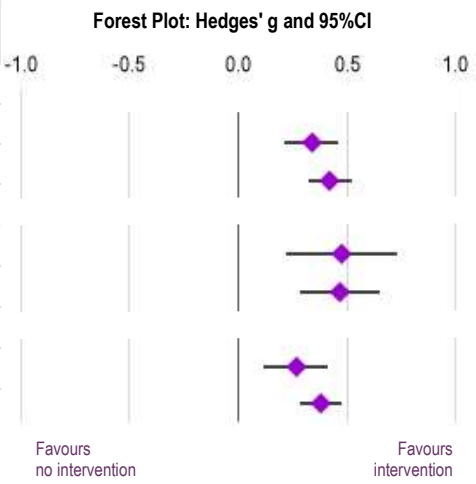


Figure 10: Effects of wellbeing interventions in LMIC on student academic and wellbeing outcomes, by setting

Program duration

There was substantial diversity amongst the programs in terms of the frequency of sessions, how long the sessions went for, and the overall duration of the program. For example, one intervention was a one-off event, while other programs consisted of 30 minute sessions for 10 weeks, or were embedded over years throughout the curriculum. This made it difficult to derive a meaningful measure of program duration (an indicator of program intensity). For the purpose of this analysis, studies were categorised into short (50%), moderate (28%) and long (22%) duration. Short programs were one school term (three months) or less, programs of moderate duration were up to one year, and long programs were defined as more than one year.

Figure 11 shows the random effects meta-analysis on academic and wellbeing outcomes by intervention duration, comparing control and treatment groups. Across wellbeing and academic outcomes, there was a clear trend that short interventions appeared to be more effective (medium effect: g = 0.512 to 0.645), than moderate and long interventions (small effect: g = 0.242 to 0.257), compared to similar students in the control conditions in LMIC. These findings are similar to those found by Dix et al. (2020) in HIC.

Duration	Hedges' g	Standard error	Lower limit	Upper limit	p-Value	Total Sample	No of Studies
Wellbeing							
Short	0.645	0.131	0.387	0.903	0.000	7207	17
Moderate	0.355	0.076	0.206	0.504	0.000	3555	8
Long	0.255	0.061	0.135	0.375	0.000	167931	8
Academic readiness							
Short	0.551	0.116	0.323	0.778	0.000	7642	12
Moderate	0.356	0.036	0.285	0.427	0.000	3078	7
Long	0.242	0.135	-0.022	0.506	0.072	17518	4
Academic achievement							
Short	0.512	0.122	0.272	0.752	0.000	2124	10
Moderate	0.279	0.036	0.209	0.349	0.000	3042	7
Long	0.257	0.059	0.140	0.373	0.000	152844	5

CMA analysis based on a random effects approach due to high heterogeneity across studies

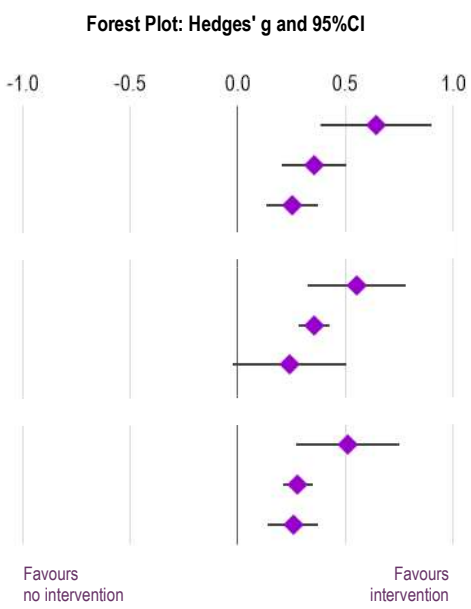


Figure 11: Effects of wellbeing interventions in LMIC on student academic and wellbeing outcomes, by program duration

Universal or targeted approach

The universal or targeted approaches to interventions were also considered. Most interventions used a universal approach (61% of studies) to promote mental health and wellbeing, while 39% involved a targeted approach. These targeted approaches were used to support specific cohorts of at-risk students like those experiencing trauma from war and tended to be of short or moderate duration.

Figure 12 shows the random effects meta-analysis of the academic and wellbeing outcomes by approach, comparing control and treatment groups in LMIC. Targeted interventions appear to be more effective than universal interventions. Targeted interventions had a moderate effect on improving student wellbeing (g = 0.651) and academic readiness (g = 0.644), compared to similar students in control groups. While universal interventions also showed improved outcomes, compared to the comparison group, the effect was consistently smaller across the wellbeing and academic outcomes (g = 0.311 to 0.327).

Focus	Hedges' g	Standard error	Lower limit	Upper limit	p-Value	Total Sample	No of Studies
Wellbeing							
Targeted	0.651	0.135	0.387	0.915	0.000	5539	12
Universal	0.327	0.048	0.233	0.421	0.000	173154	15
Academic readiness							
Targeted	0.644	0.155	0.340	0.948	0.000	6091	11
Universal	0.311	0.067	0.180	0.442	0.000	22147	6
Academic achievement							
Targeted	0.421	0.121	0.184	0.657	0.001	2104	7
Universal	0.311	0.044	0.224	0.397	0.000	155906	12

CMA analysis based on a random effects approach due to high heterogeneity across studies

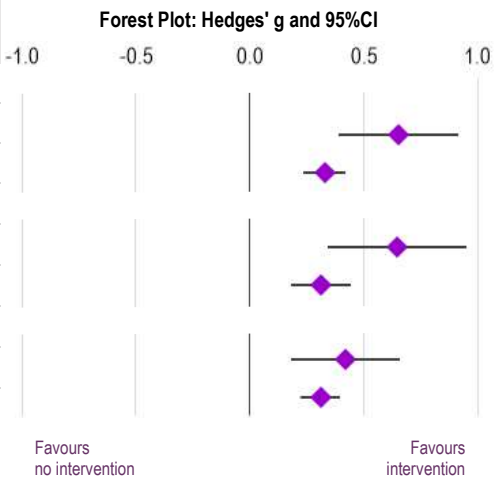


Figure 12: Effects of wellbeing interventions in LMIC on student academic and wellbeing outcomes, by approach

Comparison between LMIC and HIC

Notwithstanding the concern expressed earlier about the risk of bias being significantly higher in the 34 LMIC's studies compared to the 56 HIC's studies, a comparison between wellbeing-related interventions in HIC contexts and LMIC was undertaken.

Figure 13 shows the random effects meta-analysis of the academic and wellbeing outcomes by country context, comparing student outcomes in control and treatment groups across all HIC and LMIC's interventions. The consistent trend suggests that wellbeing-related interventions implemented in LMIC are more effective at improving student wellbeing (g = 0.390), academic readiness (g = 0.460) and academic achievement (g = 0.319) than similar interventions implemented in HIC contexts (g = 0.125 to 0.163).

This is a compelling result and suggests that children and young people in LMIC, often at greater risk of poor mental health than in HIC contexts (Patel et al., 2018), stand to benefit more from targeted and universal interventions that promote and support wellbeing. These interventions appear to have greater impact on improving academic readiness, leading to improved academic outcomes, compared to similar students in comparison groups in HIC.

Focus	Hedges' g	Standard error	Lower limit	Upper limit	p-Value	Total Sample	No of Studies
Wellbeing							
HIC overall	0.137	0.022	0.093	0.181	0.000	33500	49
LMIC overall	0.390	0.042	0.307	0.472	0.000	178693	33
Academic readiness							
HIC overall	0.125	0.030	0.067	0.183	0.000	25451	26
LMIC overall	0.460	0.079	0.304	0.615	0.000	28238	23
Academic achievement							
HIC overall	0.163	0.033	0.098	0.228	0.000	40298	54
LMIC overall	0.319	0.039	0.244	0.395	0.00	158010	22

CMA analysis based on a random effects approach due to high heterogeneity across studies

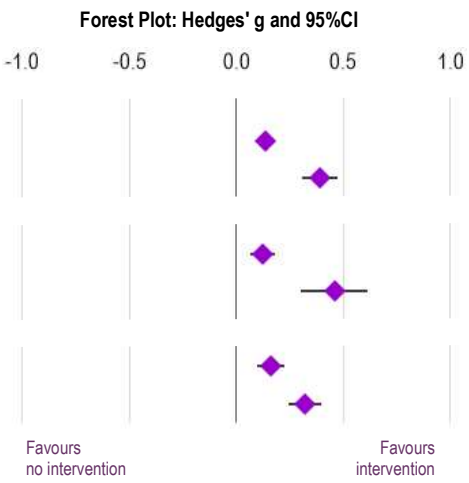


Figure 13: Effects of wellbeing interventions in LMIC on student academic and wellbeing outcomes, by interventions in LMIC and HIC

Relationship between wellbeing and academic outcomes

As discussed at the beginning of this report, positive mental health is a protective factor that can help children to participate more fully in their learning and education. Accordingly, it was of interest to investigate this relationship between student wellbeing, academic readiness, and academic outcomes in the 90 LMIC (Table 6) and HIC (Table 7) studies included in this report (see Appendix 3).

Positive correlations (r) were found between all three outcomes, using linear regression analysis (see Figure 14). The strongest relationship was between wellbeing and academic readiness ($r = 0.61$, $p < 0.001$), with readiness explaining 36.7% of the variance in wellbeing. Interestingly, the medium relationship between wellbeing and achievement ($r = 0.41$, $p < 0.001$, 16.6% variance explained), was stronger than the weaker relationship between academic readiness and achievement ($r = 0.31$, $p < 0.001$, 9.7% variance explained).

Overall, these results suggest that improvements in wellbeing correlate with improvements in academic readiness and achievement. Wellbeing outcomes in LMIC appear to play a more significant role at improving academic readiness and academic achievement than in HIC. Moreover, the wellbeing pathway between academic readiness and achievement appears to be stronger, than the direct link between academic readiness and achievement alone.

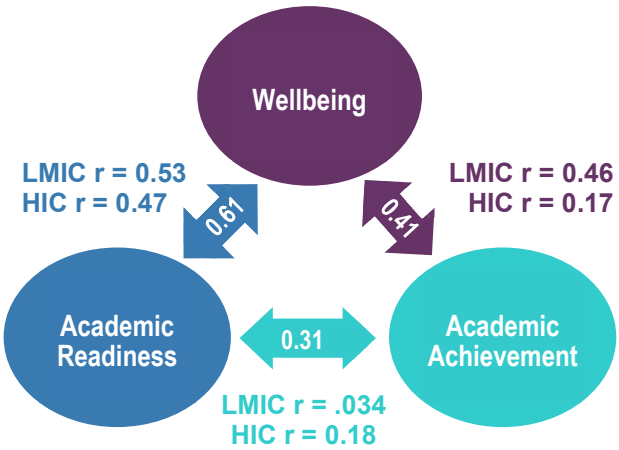


Figure 14: Correlation r between the effects of interventions on wellbeing and academic outcomes, overall and across LMIC and HIC contexts

Synthesis and key learnings

This REA synthesised evidence from school-based universal and targeted interventions that are aimed at supporting mental health and psychosocial wellbeing. The evidence presented suggests that there are effective wellbeing-related interventions in LMIC that not only improve psychosocial wellbeing but also support academic outcomes.

This chapter begins with showcasing three wellbeing programs that provide examples of the types of successful interventions being implemented in LMIC communities, and then draws together the results and findings to present the key learnings and gaps in the evidence base.

Case studies

During this review, several school-based mental health and wellbeing programs were identified in LMIC which seemed to have significant positive impact on student's mental health and wellbeing. This section highlights examples from three such programs that could be potentially replicated in LMIC in the Indo-Pacific region. The three examples in Table 4 use different research designs to evaluate and determine intervention effectiveness. It is important to note that a less-robust research design does not mean that the intervention being evaluated is of poor quality. Accordingly, while there is risk that the impact of the intervention may be overstated, the following case studies from three different LMIC contexts provide examples of interventions, diverse in their approach to delivery and their wellbeing focus.

- **Example 1** (Kaesornsamut 2012) describes a targeted short-term school-based mental health and wellbeing intervention in Thailand which improved adolescents' school belongingness and reduced their depression. It used a randomised control trial (RCT) design, often considered the 'gold standard' in the social sciences with typically the lowest risk of bias.
- **Example 2** (Baumsteiger 2022) discusses a long-term universal social-emotional skills development intervention in Mexico. It used a quasi-experimental design (QE), much more common in social research but with greater risk of reporting bias.
- **Example 3** (Latai, 2017) describes an intervention for reducing trauma amongst Tsunami survivors in Samoa, using an expressive art therapy. This study was not included in the analysis undertaken for this REA as it did not include any academic readiness or achievement outcomes. However, such a program has the potential to improve children's school outcomes and future studies on such interventions should aim to assess their impact on learning and school-level outcomes. It used a mixed-method design with no control group on a small sample and high likelihood of reporting bias.

Table 4: Case study examples of effective wellbeing programs in LMIC contexts

Example 1. **School-based Cognitive-Behavioural Therapy**	**Example 2.** **Whole-School Social-Emotional Skills Development**	**Example 3:** **Whole-School Social-Emotional Skills Development**
The Belonging against Negative Thinking and Depression (BAND) program in Thailand: A preventative mental health program for reducing depression among adolescents. This anti-depressive program combined the concepts of cognitive behavioural approach (Beck's Cognitive Model of Depression) and an interpersonal approach (Theory of Human Relatedness), to build interpersonal skills in the participating adolescents and change their negative thinking patterns. The earlier sessions of the intervention aimed to develop and strengthen a sense of belonging, while modification of negative thinking and other wellbeing activities were taught during the later sessions. This program worked to improve Thai adolescents' self-esteem, group belonging, and reduce negative thinking, & depression symptoms. • **Study**: Kaesornsamut 2012 • **Design**: Randomised control trial (RCT) • **Target group**: High school students with mild to moderate depression • **Duration**: Short - 14 one-hour sessions (2 sessions each week, over 7 weeks) • **Grouping**: Classroom • **Approach**: Targeted • **Outcomes**: Wellbeing and academic	The RULER (recognising, understanding, labelling, expressing, and regulating) program in Mexico: A program for improving social-emotional skills and supporting positive youth development. RULER applies a whole-school approach to enhance the social and emotional skills of students, teachers and staff, and school leaders from preschool through high school. RULER is grounded in multiple theories – the theory of emotional intelligence (Salovey & Mayer, 1990); and the ecological systems theory (Bronfenbrenner and Morris 2006). The tools include (1) the Charter, an agreement about how adults and children want to feel in school and behaviours to which everyone commits to; (2) the Mood Meter, a tool for building self- and social-awareness and emotion regulation; (3) the Meta-Moment, a four-step process for handling unwanted emotions; and (4) the Blueprint, an approach to resolving conflict through empathy and perspective-taking. It is a multi-phase intervention – first the teachers attend a two-day workshop and spend year one ensuring the adults at the school become familiar with RULER through personal and professional use of the approach, guided by the implementation team. Schools are supported by the RULER Online learning platform and remote meetings with RULER coaches. Second, during the following years, teachers embed RULER tools and curriculum into their instructional practices, and integrate RULER Tools and principles into routines, school practices, and policies. RULER aims to strengthen social connections throughout the school community, including relationships among students and teachers. This program fosters a range of behaviours and shifts in school climate that are essential to positive youth development. • **Study**: Baumsteiger 2022 • **Design**: Quasi-experimental (QE) • **Target group**: High school students • **Duration**: Long - 2 years • **Grouping**: Classroom • **Approach**: Universal • **Intervention type**: Social-emotional skills development • **Outcomes**: Academic readiness and Wellbeing	The Moving On- Arts Therapy in Samoa: A form of psychotherapy to cope with the trauma of dealing with grief post a devastating tsunami in 2009. The Moving On: Arts Therapy intervention was created in 2010 to promote the healing process of the affected community. It comprised of six workshops conducted over six months and offered creative self-discovery art experiences and a mixture of opportunities, for example, drawing and painting, creative story writing, poetry, puppetry, drama, and creative movement to music for expression, to help children heal the children and "move on". The intervention was evaluated at different times. Even 7 years after implementation it was reported as being beneficial at large to the children/adolescents involved in the tsunami and helped them recover from the emotional and traumatic experiences of it. Additionally, the intervention has been successful in providing much needed support to teachers, and parents to cope with the traumatic experience. Examples of community activities include the family healing night, art exhibitions and anecdotal feedback sessions which involved the sharing and reflection of student artworks, poetry, and storybooks between the children, facilitators, and community members. The intervention was widely accepted, and the model has since been used elsewhere in other contexts. • **Study**: Latai, 2017 • **Design**: Qualitative, summative evaluation impact study • **Target group**: Samoan children devastated by tsunami • **Duration**: Medium – six months • **Grouping**: Classroom • **Approach**: Universal • **Intervention type**: Social-emotional skills development • **Outcomes**: Wellbeing

Key learnings

The evidence presented in this review suggests that overall, wellbeing-related interventions are effective at improving student wellbeing and academic outcomes when implemented in LMIC. The small to moderate positive effects of the wellbeing programs discussed in the results section above, are considered in the following discussion in relation to current policy agendas in LMIC.

Improving social-emotional skills

Social and emotional learning skills play an important role in supporting academic success and overall wellbeing. The results presented in this study suggest that social-emotional interventions focused on improving student mental health and psychosocial needs are more strongly associated with academic readiness and wellbeing outcomes than with academic achievement. This is an important finding for LMIC contexts, particularly in relation to current policies focused largely on raising literacy and numeracy standards in school and in early learning environments as a means by which to improve academic outcomes.

While it has been established that early learning settings provide opportunities to nurturing the social needs of a child, many LMIC education contexts remain focused on the targeted development of literacy, numeracy, and related academic learning skills, prior to and during the early stages of formal schooling (Neuman & Okengó, 2019). Less attention has been given to the integration of mental health programs into policy and planning agendas in early learning and school settings in LMIC (Harrison et al., 2022; Keiling et al., 2011), despite acknowledgement that (social-emotional skills can also support students to effectively cope with stressors, such as those that remain as a result of the pandemic (Zieher et al., 2021).

However, the findings of this study suggest integrating mental health and wellbeing interventions can simultaneously foster academic readiness and capacity, which is an important pre-cursor to academic achievement. Given the lack of evidence on system and staff preparedness to support mental health as part of learning in LMIC (Dabrowski et al., 2022), the findings point to the need for more holistic approaches to integrating socio-emotional learning and mental health tasks as part of practice, including within teacher training and professional learning initiatives.

Improving behavioural cognitive skills

Supporting student behaviour is an ongoing challenge for educators, and often absent from teacher training programs (Reinke et al., 2011). The findings presented in this study suggest that interventions designed to modify student behaviour in the classroom, by developing pro-social skills and reduce behavioural behaviours like aggression, show a greater impact on improving academic outcomes, than wellbeing. This finding is supported by a growing body of research linking student behaviour management programs to improved student

and teacher mental health and learning (Fazel et al., 2014b). Successfully implemented programs have also been associated with increased teacher confidence, motivation, and self-efficacy (Bruns et al., 2016; Sitabkhan & Ampadu, 2021).

For LMIC contexts, this finding is significant and timely, particularly after periods of school closure and lockdown measures. Teachers internationally are reporting challenges associated with return to schooling, ranging from student disengagement and school refusal, to declines in academic performance, to anti-social behaviour (Dabrowski & Mitchell, 2022; Harmey & Moss, 2022; Trinidad, 2021). In a recent Australian survey of almost 40,000 teachers for example (AITSL, 2023), more than 30% of respondents reported their intention to exit the profession, citing workload and challenges associated with student mental health needs and behaviours as the cause. Similar findings have been reported in other international studies. For teachers in LMIC settings, these challenges are also exacerbated by an ongoing lack of equitable resourcing, teacher absenteeism, and burnout (Nietschke et al., 2023).

As education systems globally face ongoing challenges to student behaviour because of the pandemic (e.g., Meherali et al., 2021), the findings presented in this study are a useful reminder that mental health interventions focused on student behaviour can also have a positive impact on student academic outcomes. These findings emphasise the value of integrated mental health support in both classroom practice and teacher training as a means by which to support both staff and students.

Encouraging physical activity and relaxation

Physical activity and relaxation programs are widely used in HIC contexts and have also been successful implemented in many LMIC settings. However, funding and ongoing investment in such programs is often challenging in low-income settings, where school and family support for physical activity and relaxation programs vary widely (Deng et al., 2023; Goncalves et al., 2023; Hasson et al., 2023).

The findings presented in this study provide new and important links between physical wellbeing focused interventions and academic achievement. The results suggest that mental health interventions focused on physical activity and relaxation techniques have benefits on student wellbeing and academic achievement, and to a lesser extent, on academic readiness. This is also an important finding, given that exercise and relaxation programs involving physical movement and meditative activities are not always readily associated with improved academic achievement in LMIC. This is also relevant given recent studies of students in LMIC associating increased screen time, including during periods of remote learning, with reduced physical activity and self-regulation (Dabrowski & Mitchell, 2022). Online related activities are also associated with negative patterns including lower levels of sleep, decreased physical activity, increased weight, poor social life, and poor mental health (Fazeli et al., 2020).

However, physical exercise is particularly important for students in many LMIC contexts, many of whom may live in environments where exercise is restricted

(Goncalves et al., 2023), or in Island nations in the Pacific such as Nauru and the Cook Islands, which continue to experience the highest rates of childhood obesity in the world (Bertrand-Protat et al., 2023). Relaxation techniques are also beneficial for all students, including in contexts where children face increased stressors due to family and societal conflict, or environmental disasters (Ziehler et al., 2021)

Effects of intervention characteristics in LMIC contexts

The analysis of contextual factors and moderators that can influence the effectiveness of a program highlights several key insights and learnings.

1. Wellbeing-related interventions implemented in LMIC are more effective at improving student wellbeing, academic readiness, and academic achievement, than similar interventions implemented in HIC.

This is an important result and suggests that children and young people in LMIC, many of whom are at greater risk of poor mental health than in HIC and who often struggle with a scarcity of services (Rathod et al., 2017), stand to benefit to a higher degree from school-based interventions that promote and support wellbeing. Such interventions appear to have the greatest impact on improving academic readiness, leading to improved academic outcomes, compared to similar students in comparison group in LMIC.

2. Secondary school interventions in LMIC have a larger positive effect on wellbeing outcomes and academic achievement compared to primary school interventions.

However, both primary and secondary settings were found to equally support academic readiness, and to a larger effect when compared to similar students in the control conditions. This difference in effectiveness of programs between age groups can be explained by the changing importance of the class environment with age (van Loon et al., 2020). For example, children in primary schools spend every day with the same teacher and peers and generally develop close and comfortable relationships (Coffey, 2013); while students in secondary school typically develop fewer close relationships, especially with their teachers (Tobbell & O'Donnell, 2013). Secondary school students are also less likely to learn new social skills than students in primary school, and universal school-based intervention programs targeting anxiety, are likely to be more effective with primary school students compared to lower secondary students (Barrett et al., 2005; van Loon et al., 2020).

3. There was a clear trend that shorter interventions are more effective than longer interventions.

When compared to similar students in the control conditions, and when considered across both wellbeing and academic outcomes, programs of shorter duration appeared to be more effective than programs of longer

duration. In the context of this study, short programs were defined as equivalent to one school term (three months) or less, while moderate programs were up to one year's duration, and long programs were defined as more than one year. The relatively higher gains associated with programs of shorter program length may be attributed to a lack of availability of support services in LMIC (UNICEF, 2020), resulting in any interventions being useful to students on initial introduction. However, it may also suggest that in many LMIC there is a lack of ongoing support and sustainability in schools who have implemented programs of a longer duration, suggesting the need for better monitoring and evaluation.

4. Targeted interventions appear to be more effective than universal interventions in LMIC contexts.

Targeted interventions had a moderate effect on improving wellbeing, and academic readiness in students, compared to similar students in control groups. While universal interventions also showed improved outcomes, compared to the comparison group, the effect was consistently smaller across the wellbeing and academic outcomes. Many programs reviewed in this REA address one or two specific areas of mental health, such as anxiety or depression prevention, others focus on a broader range of protective factors that can support child and adolescent mental health in diverse education settings (such as socioemotional learning, self-regulation, resilience). This may be necessary to address multiple risks and protective processes. However, there is still insufficient evidence to confidently identify whether universal or targeted approaches are superior for the prevention of mental health conditions. The broader literature suggests that a combination of intervention types, from systemic whole-school implementation for all, with targeted programs for 'at risk' students, is the most effective approach within school community settings (Dix et al., 2020).

Gaps in the evidence base

The geographic spread of the studies reviewed is illustrated in the following interactive map (screenshot shown in Figure 15).

The interactive map displays the total number of studies for each country where evidence was found, while the colour of the bubble indicates whether the country is classified as LMIC or HIC. Clicking on the bubble pops up a box with key information about the study.

In terms of the distribution of studies across LMIC, many of the studies were carried out in India (nine studies), followed by Turkey (five studies) and Iran (three studies). The Democratic Republic of the Congo, Brazil, China and Mexico each had two studies, while Bhutan, Chile, Jamaica, Peru, Sri Lanka, Tanzania, Thailand, Tunisia, and Uganda were each represented by one study.

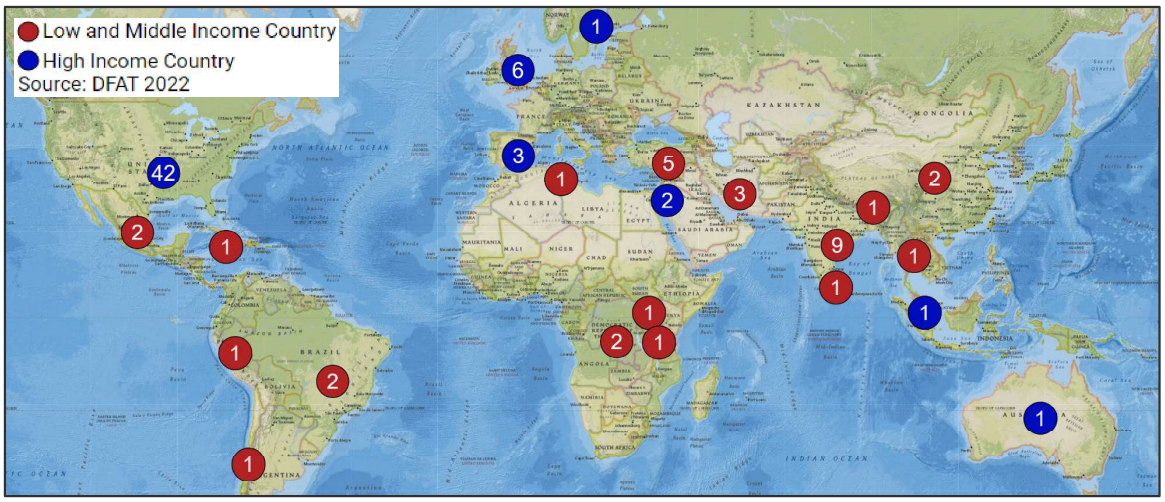


Figure 15: Screenshot of the interactive evidence map

Readiness to implement mental health programs

There is a lack of information in the studies reviewed on how readiness to implement mental health programs is assessed or evaluated prior to the implementation of an intervention. Understanding readiness is important, as in many communities in LMIC, there is limited understanding or acceptance of mental health problems, leading to hesitancy and resistance to implement programs. A broad spectrum of readiness exists, which is exacerbated by contextual factors such as socioeconomic status, or the proportion of children and adolescents impacted by additional issues such as gender-based violence, disability, or living in conflict settings (e.g., Pedersen et al., 2019; Petersen et al., 2016). Depending on context and levels of readiness, "effective" mental health programs may focus on different topics; from reducing stigma to a targeted response to mental health conditions.

Differences in program aims between LMIC and HIC

In terms of intervention focus, compared to the interventions from the HIC context, programs that involve mentoring approaches, and those that focus on preventing harm from tobacco, alcohol and drugs are noticeably absent. On the other hand, the lack of consistent training and expertise amongst educators coupled with rigid structural requirements of some education sectors in LMIC, the lack of programs involving mentors are not surprising. This is because mentoring arrangements require both time and flexibility which can be very hard to find across under-resources schools and education systems. Additionally, given the prevalence of substance abuse disorders in individuals with other co-morbid conditions, and high rates of substance use in some communities in LMIC (Cheng et al., 2016), the lack of focus of drug and alcohol abuse is an important gap, and area worthy of further investment.

Teacher and community involvement

There is a lack of information on how the interventions reviewed in this study involve or engage community members in supporting student mental health interventions, including teachers. This is consistent with other studies of interventions in LMIC. Providing parents, teachers, and community members with communicative skills, ongoing training and support, and fostering home-school communication are critical for the success of mental health interventions (Roche & Strobach, 2019). Although outside of the scope of this study, it is also important to note that currently, there are very few evidence-based programs specifically focused on supporting teacher mental health in LMIC[3].

Prevention for adolescents

There is a low level of information on school-based mental health prevention for adolescents in LMIC, which can likely be attributed to the scarcity of professionals working with students in this age group, acceptability of interventions, poor funding for mental health promotion and prevention (Gimba et al., 2020). Given the age at which many mental health conditions begin, prevention and support, rather than treatment and response, are important for this age group. This is also an important consideration for interventions focused on adolescents, which could also benefit from the inclusion of peer mentoring approaches, and targeted focus on prevention of drug and alcohol abuse given their susceptibility to peer influence at this stage in life (Andrews et al., 2020).

Diversity and inclusion

Only a limited number of studies report evidence of improving mental health and behavioural outcomes among diverse population groups, and even fewer are specifically designed for or trialled with minority ethnic groups. This is important, as discrimination based on minority status can also contribute to child and adolescent mental health conditions. While this is true also in high income contexts and should be considered more broadly in future research, it is particularly important in LMIC where the impacts of discrimination due to gender, socioeconomic status, sexuality, migrant status, religion, or cultural background, and stigma can be profound given the low level of knowledge and awareness amongst general population (Nayar et al., 2014).

[3] In a recent systematic review of mental health training programs for secondary teachers, Peterson et al., (2016) highlighted six relevant programs: Mental Health High School Curriculum Guide, The Guide Pre-Service Professional Development Program, Mental Health First Aid, Go-to Educator Training, Teachers As Accompagnateurs, and African Guide: Malawi Version.

Alignment to educational programs and practices

In many LMIC, mental health support is treated as distinct to learning. Efforts to integrate wellbeing support into education systems in LMIC are underway. For example, the United Nations Sustainable Development Goals (SDGs), particularly Goal 4 on quality education, emphasize the need to provide inclusive and equitable education that promotes wellbeing and holistic development (United Nations, 2016).

While this study demonstrates positive academic impacts of many mental health interventions, there is little evidence of alignment to existing school programs and practices in interventions found in LMIC. This is an important challenge in LMIC, as many interventions require specialist training and high levels of professional development for teachers and parents alike. In HIC the requirements of professional development are demanding and require strong academic skills (Mayer & Mills, 2021). Indeed, many LMIC lack mental health policies and legislation support for program and service provision – particularly problematic in Africa and Southeast Asia (Peterson et al., 2016; Rathod et al., 2017). The lack of integrated wellbeing interventions in LMIC may be due to a continued policy focus on raising basic achievement standards amongst students in LMIC – hence the necessity for SDG Goal 4 (United Nations, 2016).

Limitations

The REA was conducted according to a rapid but rigorous method for evidence synthesis, that involved targeted literature searches of a range of sources, systematic screening of studies for relevance, and critical appraisal of evidence. This approach means that the REA presents much of the best evidence, but not necessarily the best school-based wellbeing programs. Most studies lacked high quality evidence of impact, particularly in LMIC. Our choice to include academic outcomes also precluded many studies that only assessed wellbeing outcomes.

It is also important to acknowledge that a lack of evidence about the effectiveness of an intervention does not indicate that the intervention is ineffective. Due to rapid developments in the field of mental health, there is still a lack of evidence for many widely used mental health interventions to demonstrate improved outcomes for children and adolescents.

The diverse nature of the studies and the outcomes included in the meta-analyses made it challenging to summarise across the studies, requiring the need to categorise studies into three intervention types and outcomes into three domains to assess and present the evidence as succinctly as possible. This reflects educational research (versus medical research, for example), which tends to use a wide variety of standardised tests to assess numeracy and literacy achievement and an even wider array of validated scales and instruments to assess wellbeing outcomes. Because this review adopted a broad perspective on health and wellbeing, it was challenging to be consistent about what could be categorised into the three wellbeing domains which emerged through a process of thematic analysis.

In terms of study design, findings from the analysis presented in this REA show that in the context of LMIC, suggest that quasi-experimental designs may be over-estimating the effectiveness of the wellbeing intervention, and be less accurate than studies that involve a Randomized Control Trial (RCT) design. The findings of research conducted on mental health programs in LMIC schools, as generated through experimental and quasi-experimental studies, should therefore be interpreted with caution. It should also be noted that based the risk bias assessment, quasi-experimental studies are at much greater risk of bias compared to RCT studies.

Finally, the review was restricted to studies in the English language and so there may be a potential publication bias. Further sources of publication bias arise when intervention studies showing no difference might be published less often than those that do identify a clear benefit. All studies had at least one domain appraised as a high risk of bias, suggesting that caution needs to be exercised in interpreting these findings.

Conclusion and recommendations

The education sector plays an important role in promoting positive mental health and preventing or responding to mental health conditions within learning settings. Educating children and adolescents and communities about protective behaviour, and teaching them coping skills, can help children react positively to change and navigate obstacles in life, allowing for greater cognitive, social, emotional, and academic success.

Ongoing support and investment in mental health services remain important for students in LMIC, where many young people face additional risks to their health and wellbeing (Patel et al., 2018; Silove et al., 2017). Effective, school-based programs that support the mental health needs of students continue to be a source of interest for policymakers and practitioners, however, there remains a lack of evidence on the effectiveness of these programs in LMIC. The findings presented in this report suggest that in LMIC, school-based interventions *do* have the potential to improve students' mental health and psychosocial wellbeing. The results also suggest that interventions implemented in LMIC are more effective at improving student wellbeing, academic readiness, and academic achievement than similar interventions implemented in HIC.

Policymakers, donors, and key educational stakeholders in LMIC are in a unique position to reflect on and drive investment in effective mental health interventions that can be strengthened, replicated, or adapted in other contexts. The research presented in this report highlights the characteristics of effective mental health interventions that can also improve student academic outcomes in LMIC. However, it should be acknowledged that there is much diversity across LMIC contexts, and levels of stigma towards student mental health, as well as the readiness of education stakeholders and community members to support and integrate mental health as part of educational practice, will vary.

For this reason, the recommendations presented below are designed to highlight best practices and key actions that can support implementation and ongoing investment in effective student mental health programs and practices.

The recommendations (see Figure 16) are based on a synthesis of the literature and new analysis undertaken in this report, including an identification of current gaps in evidence around program investment and evaluation in LMIC. The recommendations are also supported by academic and grey literature focused on effective implementation of school-based mental health programs in LMIC, identified as part of this study.

Figure 16: Recommendations for supporting student mental health and wellbeing in schools and across education systems

Recommendation 1. Start early

Although mental health promotion and support is important across the life span, early intervention is important, particularly during the preschool years, when programs are likely to have more influence on young children's development and build their resilience into adulthood (Harrison et al., 2022; Keiling et al., 2011). This review also shows that secondary school interventions in LMIC tend to have a larger positive effect on wellbeing outcomes and academic achievement when compared to primary school interventions. Thus integrating a wellbeing focus in the early years can also support academic readiness, engagement, and achievement later in life.

Recommendation 2. Reduce stigma and build readiness

Increasing mental health literacy and reducing stigma within communities is key to effective implementation of mental health and wellbeing programs in educational settings (Rathod et al., 2017). Whole school approaches that include teachers, parents, and caregivers in the design and delivery of mental health interventions allow for modelling appropriate behaviours that can reduce stigma and protect students from the onset of mental health conditions. Understanding the readiness of a school community to adopt and implement programs also needs to be considered when adopting whole-school and systemic approaches to mental health promotion, so as to ensure interventions are appropriate and respond to the current levels of knowledge and investment within communities.

Recommendation 3. Support teachers

There is an established link between positive teacher mental health and wellbeing and student mental health (Gray et al., 2017; Harding et al., 2019). However, the competing demands on teachers often make it difficult to prioritise their own mental health or support the mental health of their students (Palmer et al., 2017). Teachers often need to work additional hours beyond formal classroom time and may have to do professional development in their own time. Low levels of pay are associated with low levels of motivation and retention (Crehan, 2016), and thus, attrition rates may be very high, which can impact the efficacy of mental health program implementation. In many instances, teachers and community leaders work at the community level to facilitate the implementation of mental health programs. Therefore, providing teachers with training and time can promote commitment, involvement, and acceptance of mental health programs. For this reason, some governments are beginning to fund the development and provision of educator wellbeing resources to support teachers' mental health (e.g., the Be You Initiative in Australia).

Recommendation 4. Involve family and community members

Whole school approaches to mental health support are particularly effective (Dix et al., 2020), and engagement of community members is an effective implementation practice. In many contexts, mental health programs implemented with local partners who have established networks amongst communities, can bring local knowledge to the implementation of mental health programs, and encourage uptake and sustainability. Involving family and community members is also important to ensure that interventions have the desired impact in the communities (García-Carrión et al., 2019) and are culturally appropriate (Bloemraad & Terriquez, 2016; Kia-Keating et al., 2017).

Recommendation 5. Contextualise programs

In LMIC, targeted programs that focus on one or two specific mental health conditions relevant to the specific needs of students, are generally more effective than universal programs designed to support various needs of all students. Programs that recognise the different contextual needs of students and see mental health and wellbeing as an integral component of learning are also most effective (van Loon et al., 2020).

Recommendation 6. Focus on evidence

Not all programs are supported by evidence of effectiveness, and not all research designs are equally effective. Results from the critical appraisal of studies included in this review shows that all studies had multiple domains at high risk of bias and some studies did not have a control group. Among the randomised controlled trials (39%), which are generally regarded as the 'gold' standard in research designs, issues were also identified such as a high risk of bias due to the lack of blinding of participants and study personnel and lack of blinding of outcome assessment. Additionally, information about random sequence generation and allocation concealment was unclear for most trials. Thus, to understand and analyse program effectiveness it is important to look for various indicators of impact, including insights from similar educational environments and communities (Brown et al., 2017; Jordans et al., 2016; Knerr et al., 2013; Tol et al., 2011). Ongoing monitoring of mental health and wellbeing programs is key to sustainable practice and impact and sharing of lessons learnt can promote sustainability and quality.

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Reviewed studies from LMIC are in **bold text**. Studies from HIC have the first author in **bold**.

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Appendix 1: Previous systematic reviews

Table 5: Examples of previous systematic reviews of relevance to the current review

SR Author date	Title of the review	Outcomes of interest linked to learning and school	LMIC included in the review
Barry 2013	A systematic review of the effectiveness of mental health promotion interventions for young people in low- and middle-income countries	Students' emotional and behavioural wellbeing, including improved self-esteem and coping skills, motivation, and self-efficacy	India, Chile, South Africa, Mauritius, Nepal, Palestine, Uganda, Lebanon
Dix 2020	Student health and wellbeing: A systematic review of intervention research examining effective student wellbeing in schools and their academic outcomes	Academic (literacy and numeracy), behavioural, cognitive, social-emotional, belonging and engagement, mentoring, resilience	Turkey, Democratic Republic Congo, Israel, Bhutan, Brazil, India, Mexico, Peru, Tanzania
Fazel 2014	Mental health interventions in schools in low-income and middle-income countries	School engagement and pro-social behaviours	India, Nepal, Indonesia, Sri Lanka and others
Ferreira-Vorkapic 2015	Are There Benefits from Teaching Yoga at Schools? A Systematic Review of RCTs of Yoga-Based Interventions	Yoga or yoga-based: Psychological wellbeing and cognitive functions, such as attention and memory	India
Garcia-Carrion 2019	Children and Adolescents Mental Health: A Systematic Review of Interaction-Based Interventions in Schools and Communities	Mental health: Depression and anxiety, aggression and behavioural issues, self- concept, self-esteem, self-efficacy, and empowerment, classroom climate and teacher-student and peer interactions	Kenya
Hunt 2023	Effectiveness of Social Inclusion Interventions for Anxiety and Depression among Adolescents: A Systematic Review	Social skills, life skills and youth empowerment	Malawi, Uganda, India, Thailand
Langford 2015	The World Health Organization's Health Promoting Schools framework: A Cochrane systematic review and meta-analysis	Physical health, bullying, absenteeism, attendance, motivation	Mexico, India, China, Egypt, Tanzania
Murano 2020	A Meta-Analytic Review of Preschool Social & Emotional Learning Interventions	SEL skills, problem behaviours	South Africa
Sancassiani 2015	Enhancing the Emotional and Social Skills of the Youth to Promote their Wellbeing and Positive Development: A Systematic Review of Universal School-based RCTs	SEL & Life Skills Training: Healthy behaviours, emotional and social skills, academic performance	South Africa, Thailand, Mexico
Sklad 2012	Effectiveness of school-based universal social, emotional, and behavioural programs: do they enhance students' development in the area of skill, behavior and adjustment?	SEL skills: Students' positive self-image, behavioural adjustment - antisocial behaviour, prosocial behaviour, substance abuse, mental health disorders, and academic achievement	Zambia

Appendix 2: PRISMA flow diagram

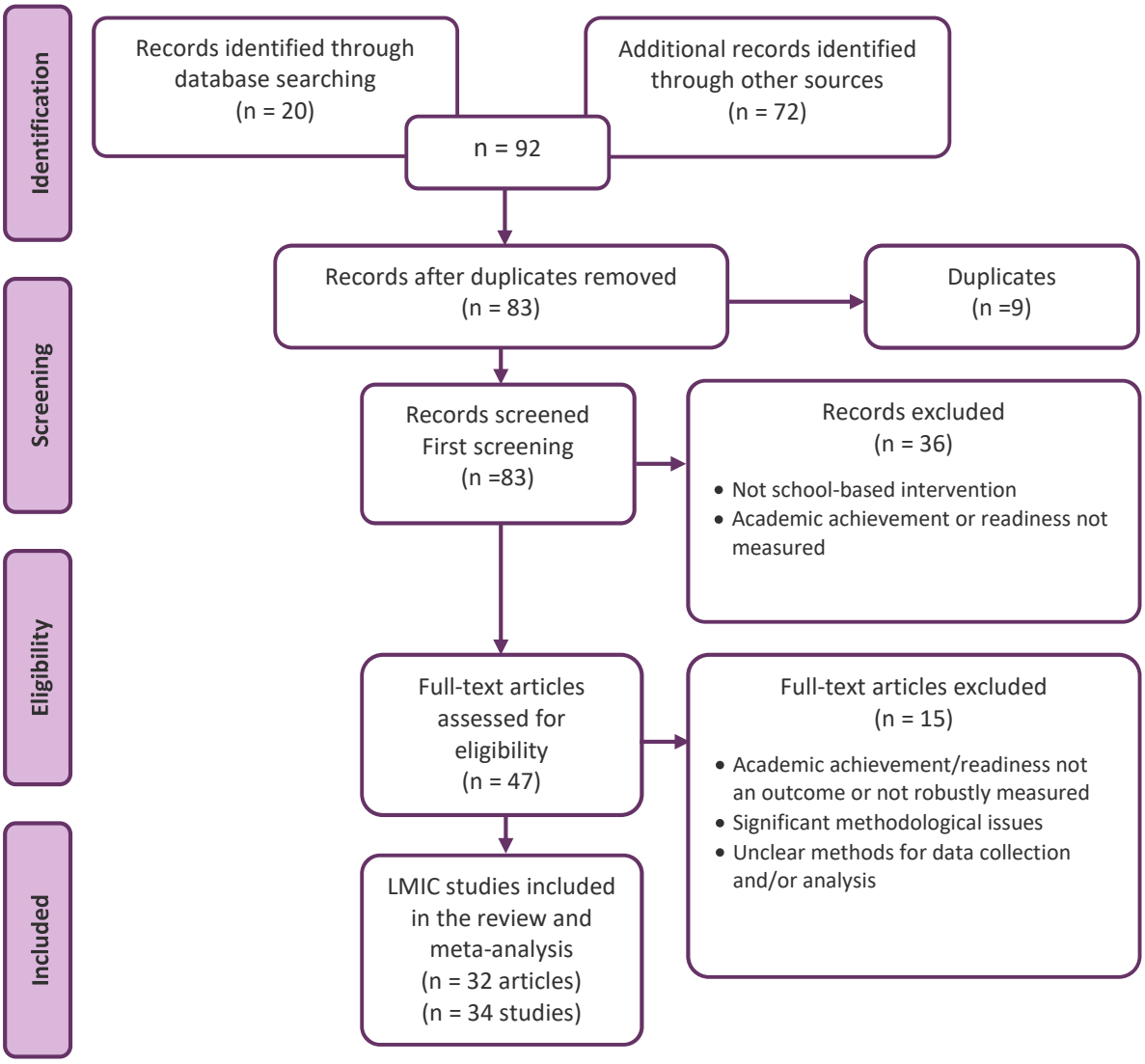

Figure 17: PRISMA flow diagram showing identification and selection of studies from LMIC

Appendix 3: Characteristics of included studies in LMIC and HIC

Table 6: Characteristics of the included studies in LMIC

DESIGN			PARTICIPANTS			SETTING		INTERVENTION					OUTCOMES		
Author (year)	LMIC	Design	N	Age Mean (SD), range in years	% Boys	Grade	Type P: primary S: secondary	Name or type	Domain	Duration	Grouping	Approach	Achievement	Readiness	Wellbeing
Aber 2017	D. Rep. Congo	RCT	63 schools 4142 students	not stated	52	2-4	P	Learning in a Healing Classroom	Social-emotional skills	Long	Classroom	Universal	2		1
Adler 2016	Mexico	RCT	70 schools 68762 students	16.2 (1.1), 13-26	48	10-11	S	Wellbeing curriculum: Bienestar	Social-emotional skills	Long	Classroom	Universal	1		1
Adler 2016	Peru	RCT	694 schools 694153 students	15.4 (0.8), 11-26	47	7-11	S	Wellbeing curriculum: Paso a Paso (Step by Step)	Social-emotional skills	Long	Classroom	Universal	1		1
Adler 2016	Bhutan	RCT	18 schools 8385 students	15.1 (2.2), 10-24	46	9-12	S	Wellbeing curriculum: GNH Life Skills	Social-emotional skills	Long	Classroom	Universal	1		1
Agrawal 2013	India	RCT	44 students	11.3 (0.8) 10-12	59	7-8	S	Yoga	Physical activity & relaxation	Short	Classroom	Universal		1	3
Anusuya 2021	India	RCT	60 students	15.3 (0.7) 14-16	not stated	8-9	S	Mind Sound Resonance Technique (MSRT)	Physical activity & relaxation	Short	Classroom	Universal	1	1	2
Baker-Henningham 2012	Jamaica	RCT	225 students	4.2 (0.6) 4-5	67	Preschool	P	Incredible Years Teacher Training	Behavioural cognitive skills	Moderate	Classroom	Universal		2	3
Bakir 2017	Turkey	QE	1 school 60 students	not stated	50	10	S	Physical activity	Physical activity & relaxation	Short	Medium group	Universal	2		4
Barboza 2021	Brazil	QE	61 students	7.8 (0.6)	not stated	3-6	P	Physical activity	Physical activity & relaxation	Moderate	Classroom	Universal	1	1	
Baumsteiger 2022	Mexico	QE	37 schools 1662 students	16.7 (2.3) 15-18	46	10-12	S	RULER	Social-emotional skills	Short	Classroom	Universal		1	1
Berger 2018	Tanzania	QE	1 school 183 students	12.5 (0.9), 11-14	49	4-6	P	ERSAE-Stress-Prosocial (ESPS)	Social-emotional skills	Moderate	Classroom	Targeted	1	2	4
Bhardwaj 2017	India	RCT	26 students	11.0 (1.2) 10-13	54	3-5	P	Yoga	Physical activity & relaxation	Moderate	School/ Home	Universal		1	2
Çalik 2018	Turkey	QE	1 school 243 students	10.9 (0.6)	51	not stated	S	Physical activity: International Association of Athletics Federations (IAAF) KIDS ATHLETICS	Physical activity & relaxation	Moderate	Classroom	Targeted	2		1
Diken 2010	Turkey	QE	24 students	6-8	87	Preschool-2	P	First Step to Success	Behavioural cognitive skills	Long	School/ Home	Targeted		2	1
Gonçalves 2017	Brazil	RCT	1 school 105 students	7.4 (0.4), 6.5-8.1	53	2	P	Massage and Storytelling	Physical activity & relaxation	Short	One to one	Targeted	2		2
Gulati 2018	India	QE	116 students	10.2 (0.6) 9-12	67	2-7	P	Yoga	Physical activity & relaxation	Short	Classroom	Universal	2	1	2
Guzmán 2015	Chile	QE	3935 students	5-8	51	1-3	P	Skills for Life (SFL) Student workshops Low engagement	Behavioural cognitive skills	Short	Classroom	Targeted		2	2

DESIGN			PARTICIPANTS			SETTING		INTERVENTION					OUTCOMES		
				Age		Grade	Type								
Author (year)	LMIC	Design	N	Mean (SD), range in years	% Boys	P: primary S: secondary		Name or type	Domain	Duration	Grouping	Approach	Achievement	Readiness	Wellbeing
Harrison 2017	China	RCT	30 schools 790 students	6-12	45	1-8	P	ChildCARE - Child-only	Social-emotional skills	Short	One to one	Targeted	3	12	
Jarraya 2019	Tunisia	QE	30 students	5.2	38	1-2	P	Yoga	Physical activity & relaxation	Short	Classroom	Universal		1	1
Kaesornsamut 2012	Thailand	RCT	60 students	16.9	52	10-12	S	Belonging against Negative Thinking and Depression (BAND)	Behavioural cognitive skills	Short	Classroom	Targeted		1	2
Karbasdehi 2019	Iran	QE	26 students	11.2 (0.2) 10-12	not stated	4-6	P	Self-regulation empowerment of students with Dyscalculia	Behavioural cognitive skills	Short	School	Targeted	1	1	4
Kiani 2017	Iran	QE	30 students	13-15	not stated	7-8	S	mindfulness meditation	Physical activity & relaxation	Short	Small group	Targeted	1	4	1
Lan 2018	China	QE	55 students	9-12	not stated	3-6	P	SST: executive function training and social skills training	Behavioural cognitive skills	Moderate	School	Targeted		12	14
McMullen 2018	Uganda	QE	170 students	13-18	56	7-10	S	Wellbeing curriculum: Living Well	Social-emotional skills	Long	Classroom	Universal		1	3
Ozan 2018	Turkey	QE	1 school 45 students	not stated	49	12	S	Formative Assessment intervention	Behavioural cognitive skills	Moderate	Classroom	Targeted	1	1	
Paeezy 2010	Iran	QE	30 students	not stated	0	8	S	Assertiveness training	Behavioural cognitive skills	Short	not stated	Universal	1		1
Shinde 2018	India	QE	74 schools 8511 students	13.7 (0.8)	53	9	S	Wellbeing curriculum: SEHER (Strengthening Evidence base on scHool-based intErventions for pRomoting) adolescent health	Social-emotional skills	Long	School	Universal		2	1
Singhal 2018	India	QE	100 students	13-18	not stated	8-10	S	Coping skills program	Social-emotional skills	Short	Small group	Targeted		1	5
Sinha 2021a	India	RCT	249 students	11-16	50	7-10	S	Integrated classroom yoga module (ICYM)	Physical activity & relaxation	Moderate	Classroom	Universal	1		3
Sinha 2021b	India	QE	49 students	13.6 (1.0) 12–16	50	7-10	S	Yoga	Physical activity & relaxation	Moderate	Classroom	Universal	1		3
Telles 2013	India	RCT	1 school 98 students	10.5 (1.3), 8-13	61	3-7	P	Yoga	Physical activity & relaxation	Short	Large group	Universal	1		1
Tol 2012	Sri Lanka	QE	200 students	11.0 (1.1)	61	not stated	P	Mental health PTSD intervention	Behavioural cognitive skills	Short	Classroom	Targeted		2	8
Torrente 2019	D. Rep. Congo	RCT	116 schools 8813 students	11.7 (1.9)	53	2-5	P	Learning in a Healing Classroom	Social-emotional skills	Long	Classroom	Universal	3	1	2
Wolmer 2005	Turkey	QE	287 students	11.5 (1.3) 9-17	39	5-12	S	School Reactivation Program	Social-emotional skills	Short	Classroom	Targeted	1		3

Table 7: Characteristics of the 56 included studies in HIC contexts

DESIGN			PARTICIPANTS			SETTING		INTERVENTION					OUTCOMES		
Author (year)	HIC	Design	N	Age Mean (SD), range in years	% Boys	Grade P: primary S: secondary C: Combined K-12 O: Other & Special	Type	Name or type	Domain	Duration	Grouping	Approach	Achievement	Readiness	Wellbeing
Ashdown 2012	Australia	RCT	1 school 99 students	5-6	55	P-1	P	You Can Do It!	Social-emotional skills	Short	Classroom	Targeted: Disadvantaged	2	2	6
Battistich 2004	USA	QE	6 schools 525 students	not stated	46	3-5	P	CDP: Child Development Project	Social-emotional skills	Long	Classroom	Targeted: Disadvantaged	1	2	5
Bavarian 2013	USA	RCT	14 schools 1170 students	not stated	47	3-8	P	Positive Action	Social-emotional skills	Long	Classroom	Targeted: Disadvantaged	2	2	
Benson 2017	USA	QE	1 school 369 students	not stated	49	K-5	P	Second Step: K-5	Social-emotional skills	Short	Classroom	Targeted: Academic risk	2	1	2
Borman 2019	USA	RCT	11 schools 1304 students	not stated	51	6	C	Writing to belong	Social-emotional skills	Moderate	Classroom	Targeted: Academic risk	1	2	2
Bowers 2015	USA	QE	1 school 201 students	13.2 (0.4), 12-15	51	8	C	SSS: Student Success Skills	Social-emotional skills	Short	Classroom	Targeted: Academic risk	1	2	1
Brackett 2012	USA	QE	3 schools 273 students	11 (1.0), 9.3-12.5	45	5-6	P	RULER	Social-emotional skills	Moderate	Classroom	Targeted: Academic risk	2		3
Brigman 2007	USA	QE	12 schools 220 students	not stated	46	5,6,8,9	C	SSS: Student Success Skills	Social-emotional skills	Short	Classroom	Targeted: Academic risk	2		1
Cale 2010	USA	QE	1 school 108 students	14-18	50	9-12	S	ABC: Adventure-based counselling	Physical activity & relaxation	Short	Medium group	Targeted: Academic risk	1		2
Campbell 2005	USA	QE	20 schools 240 students	not stated	not stated	5-6	P	SSS: Student Success Skills	Social-emotional skills	Short	Medium group	Targeted: Academic risk	2		1
Caprara 2014	Italy	QE	1 school 324 students	12.7 (0.51)	51	7	C	CEPIDEA: Promoting prosocial behaviour	Behavioural cognitive skills	Moderate	Classroom	Targeted: Academic risk	1		6
Castro 2005	USA	QE	1 school 70 students	not stated	63	7-8	C	Teen Leadership	Behavioural cognitive skills	Moderate	Classroom	Targeted: Academic risk	1		2
Challen 2011	UK	QE	14 schools 3763 students	not stated	52	7	S	UKRP: UK Resilience Programme	Behavioural cognitive skills	Moderate	Medium group	Targeted: Academic risk	2	1	3
Cho 2005	USA	QE	7 schools 1218 students	15.2 (0.9), 14-16	50	9-11	S	RY: Reconnecting Youth	Behavioural cognitive skills	Long	Medium group	Targeted: Academic risk	1	1	4
Chuang 2020	USA	QE	8 Schools 1817 students	not stated	52	K-3	P	IYTCM: Incredible Years Teacher Classroom Management	Behavioural cognitive skills	Moderate	Classroom	Targeted: Academic risk	2		2
Connor 2010	USA	RCT	10 school 445 students	not stated	49	1	P	ISI: Individualizing student instruction	Behavioural cognitive skills	Moderate	Classroom	Targeted: Academic risk	3	1	
Cooley-Strickland 2011	USA	QE	2 schools 93 students	9.4 (1.1), 8-12	52	3-5	P	FRIENDS	Behavioural cognitive skills	Moderate	Small group	Targeted: Academic risk	2		3
Culclasure 2019	USA	QE	3 schools 2362 students	not stated	51	3-10	C	PjBL: Project-Based Learning	Social-emotional skills	Long	Classroom	Targeted: Academic risk	2	3	

DESIGN			PARTICIPANTS			SETTING		INTERVENTION					OUTCOMES		
				Age		Grade	Type								
Author (year)	HIC	Design	N	Mean (SD), range in years	% Boys	P: primary S: secondary C: Combined K-12 O: Other & Special		Name or type	Domain	Duration	Grouping	Approach	Achievement	Readiness	Wellbeing
Diperna 2016	USA	RCT	6 schools 402 students	7.4 (0.4)	45	2	P	SSIS-CIP: Social Skills Improvement System Classwide Intervention Program	Behavioural cognitive skills	Short	Classroom	Targeted: Academic risk	2	2	
Espelage 2016	USA	RCT	12 schools 123 students	11.3 (0.5), 11-12	57	6-7	C	Second Step: Student Success Through Prevention	Social-emotional skills	Long	Classroom	Targeted: Academic risk	3		4
Filella 2016	Spain	QE	10 schools 574 students	10.5 (0.7)	52	5-6	P	Happy 8-12 Emotional Education	Social-emotional skills	Moderate	One to one	Targeted: Academic risk	2		2
Filella 2018	Spain	QE	11 schools 903 students	12.6 (0.6)	52	1-2	S	Happy 12-16 Emotional Education	Social-emotional skills	Moderate	One to one	Targeted: Academic risk	1	1	4
Firth-Clark 2019	UK	RCT	4 schools 77 students	11-16	67	7-11	S	Sport Psychology & Biofeedback	Physical activity & relaxation	Moderate	Medium group	Targeted: Academic risk	4		2
Flannery 2020	USA	RCT	4 schools 1588 students	14	50	9	S	Freshmen Success	Behavioural cognitive skills	Short	Classroom	Targeted: Academic risk	1	3	
Frank 2017	USA	RCT	1 school 159 students	not stated	52	6,9	C	TLS: Transformative Life Skills	Physical activity & relaxation	Moderate	Classroom	Targeted: Academic risk	2	1	5
Gatz 2019	USA	QE	2 schools 59 students	12.5 (0.9), 11-14	0	6-8	C	Aerobic Fitness	Physical activity & relaxation	Moderate	Large group	Targeted: Academic risk	1		1
Gibbons 2006	USA	RCT	40 schools 2800 students	not stated	not stated	3-4	P	CHARACTERplus Way: Children	Social-emotional skills	Long	Classroom	Targeted: Academic risk	2		3
Gibbons 2006	USA	RCT	64 schools 3500 students	not stated	not stated	4,8,11	C	CHARACTERplus Way: Young People	Social-emotional skills	Long	Classroom	Targeted: Academic risk	2		3
Gray 2011	USA	RCT	1 school 95 students	12.9, 12.0-13.8	49	7	C	Test Anxiety Reduction	Behavioural cognitive skills	Short	Large group	Targeted: Academic risk	1		2
Hagins 2016	USA	RCT	1 school 112 students	15.3 (1.0)	52	9-11	S	Yoga	Physical activity & relaxation	Long	Classroom	Targeted: Academic risk	1	2	4
Hanson 2011	USA	RCT	13 schools 2309 students	not stated	52	1-4	P	Tribes	Behavioural cognitive skills	Long	Classroom	Targeted: Academic risk	2	1	1
Hanson 2012	USA	RCT	50 schools 4683 students	not stated	50	4-5	P	Lessons in Character	Social-emotional skills	Long	Classroom	Targeted: Academic risk	1		5
Jones 2011	USA	RCT	18 schools 1184 students	8.2 (0.7)	49	2-4	P	4Rs	Social-emotional skills	Long	Classroom	Targeted: Academic risk	2	1	2
Kall 2015	Sweden	QE	4 schools 545 students	9.9 (2.2)	52	K-6	P	Curriculum based physical activity	Physical activity & relaxation	Moderate	Classroom	Targeted: Academic risk	2		10
Keogh 2006	UK	RCT	1 school 160 students	15.6 (0.5), 15-16	54	not stated	S	SMI: Stress management intervention	Behavioural cognitive skills	Short	Small group	Targeted: Academic risk	1		4
Khng 2017	Singapore	RCT	4 schools 154 students	10.7 (0.4)	52	5	P	Deep breathing	Physical activity & relaxation	Short	Medium group	Targeted: Academic risk	1		3
Legum 2004	USA	RCT	1 school 57 students	not stated	not stated	6-7	C	Career Target	Behavioural cognitive skills	Short	Large group	Targeted: Academic risk	1		1
Linares 2005	USA	QE	2 schools 119 students	9.6 (0.4), 8.9-11.0	not stated	4-5	P	Unique Minds	Social-emotional skills	Long	Classroom	Targeted: Academic risk	2		2
Lopata 2019	USA	RCT	35 schools 103 students	8.8 (1.4), 6-12	91	1-5	P	schoolMAX	Social-emotional skills	Short	Small group	Targeted: Academic risk	5		2

DESIGN			PARTICIPANTS			SETTING		INTERVENTION					OUTCOMES		
Author (year)	HIC	Design	N	Age Mean (SD), range in years	% Boys	Grade P: primary S: secondary C: Combined K-12 O: Other & Special	Type	Name or type	Domain	Duration	Grouping	Approach	Achievement	Readiness	Wellbeing
Low 2019	USA	RCT	61 school 8491 students	not stated	not stated	K-3	P	Second Step: Student Success through Prevention	Social-emotional skills	Long	Classroom	Targeted: Academic risk	2	3	6
Marino 2010	USA	RCT	1 school 128 students	8.9 (0.5), 8-10	53	4	O	Zumba Gold dance	Physical activity & relaxation	Short	Classroom	Targeted: Academic risk	1	4	2
Muñoz 2006	USA	QE	16 schools 1250 students	not stated	47	3-5	P	CDP: Child Development Project	Social-emotional skills	Long	Classroom	Targeted: Academic risk	1	4	1
Muratori 2016	Italy	RCT	2 schools 184 students	7.6 (0.5)	43	1-2	P	Coping Power	Behavioural cognitive skills	Moderate	Classroom	Targeted: Academic risk	1		2
Murray 2005	USA	QE	1 school 48 students	not stated	75	9-12	S	Teacher-Student Relationship	Social-emotional skills	Moderate	One to one	Targeted: Academic risk	1	3	1
Owens 2005	USA	QE	3 schools 42 students	8.5 (1.6)	71	K-6	P	YESS: Youth Experiencing Success in School	Behavioural cognitive skills	Moderate	One to one	Targeted: Academic risk	1	8	4
Reinke 2018	USA	RCT	7 schools 1817 students	7.1 (1.2)	51	K-3	P	IYTCM: Incredible Years Teacher Class Management	Behavioural cognitive skills	Moderate	Classroom	Targeted: Academic risk	1		3
Ros-Morente 2018	Spain	QE	17 school 1477 students	10.5 (0.7) 12.6 (0.6)	52	5-6, 7-8	C	Happy 8-12-16 Emotional Education	Social-emotional skills	Moderate	One to one	Targeted: Academic risk	3		4
Roughan 2011	UK	RCT	1 school 15 students	12.9 (0.6)	59	not stated	C	Working memory training	Behavioural cognitive skills	Short	One to one	Targeted: Academic risk	1	2	2
Seaton 2010	USA	QE	1 school 40 students	15-17	0	9	S	Check & Connect Student Engagement Program	Behavioural cognitive skills	Short	One to one	Targeted: Academic risk	2	5	1
Sinclair 2016	USA	RCT	11 classrooms 115 students	17.6 (2.0), 14-21	70	9-12	O	Think, Be, Do curriculum	Behavioural cognitive skills	Short	Classroom	Targeted: Special needs	1		6
Skryabina 2016	UK	RCT	40 schools 1337 students	9-10	48	not stated	P	FRIENDS	Behavioural cognitive skills	Long	Classroom	Universal	3		4
Sloan 2020	Northern Ireland	QE	44 schools 386 students	5-6	65	R-1	P	Nurture Group	Social-emotional skills	Long	Medium group	Targeted: Academic risk	2	3	3
Shoshani 2016	Israel	QE	6 schools 2517 students	13.5 (0.7), 11.9-14.9	50	7-9	S	Wellbeing curriculum: Maytiv positive psychology school	Social-emotional skills	Moderate	Classroom	Universal	1	6	4
Stebbins 2012	USA	QE	1 school 51 students	12.6 (1.3), 9-15	88	4-10	O	Equine Assisted Activities	Physical activity & relaxation	Moderate	One to one	Targeted: Special needs	1	1	5
Tzohar-Rozen 2013	Israel	QE	3 schools 107 students	10-11	54	5	P	Affective self-regulation in Maths	Behavioural cognitive skills	Short	Classroom	Universal	2		2
Wendt 2015	USA	QE	2 schools 194 students	not stated	56	9	S	Quiet Time	Physical activity & relaxation	Moderate	Classroom	Universal	2		5

Appendix 4: Risk of bias assessment

Risk of bias

Table 8 shows each assessment domain was rated for risk of bias as Low, Unclear, or High risk.

Table 8: Risk of bias assessment in randomised control trials (RCT) and quasi-experimental (QE) studies undertaken in LMIC

First Author year	Design *no control group	Selection bias Random sequence generation	Allocation concealment	Group bias Comparison groups are similar	Performance bias Blinding of participants and research	Detection bias Blinding of outcome assessment	Measurement bias Outcomes measured reliably	Attrition bias Incomplete outcome data	Reporting bias Selective reporting of results
Aber 2017	RCT	Low	High	Low	High	High	Low	Unclear	Low
Adler 2016	RCT	Low	Low	Low	Low	High	Low	Unclear	Low
Agrawal 2013	RCT	Low	High	Low	High	High	Low	Low	Low
Anusuya 2021	RCT	Low	Low	Low	High	Low	Low	Low	Low
Baker-Henningham 2012	RCT	Low	Low	Low	High	Low	Low	Low	Low
Bakir 2017	QE	High	High	Low	High	High	Low	High	Low
Barboza 2021	QE	High	High	Low	High	High	Low	Low	Low
Baumsteiger 2022	QE*	High	High	High	High	High	Low	High	Low
Berger 2018	QE	Low	High	Low	High	High	Low	High	Low
Bhardwaj 2017	QE*	High	High	High	High	High	Low	Unclear	Low
Çalik 2018	QE	High	Unclear	Low	Unclear	Unclear	Low	High	Low
Diken 2010	QE	Unclear	Unclear	Low	Unclear	Unclear	Low	Unclear	Low
Gonçalves 2017	RCT	Low	High	Low	High	Low	Low	High	Low
Gulati 2018	QE*	High	High	Low	High	High	Unclear	Unclear	Unclear
Guzmán 2015	QE*	High	High	Low	High	High	Low	High	Low
Harrison 2017	RCT	Low	High	Low	High	High	Low	Unclear	Low
Jarraya 2019	RCT	Low	Low	Low	Low	High	Low	Low	Low
Kaesornsamut 2012	RCT	Low	Unclear	Low	Unclear	Unclear	Low	Low	Low
Karbasdehi 2019	QE	High	High	Low	High	High	Unclear	High	Low
Kiani 2017	RCT	Low	Unclear	Low	Unclear	Unclear	Unclear	Low	Low
Lan 2018	RCT	Low	Low	Low	Low	Low	Low	Low	Low
McMullen 2018	QE	High	High	Low	High	High	Low	Low	Low
Ozan 2018	QE	Unclear	High	Low	High	High	Low	Low	Low
Paeezy 2010	QE*	High	High	Low	High	High	Unclear	Unclear	Unclear
Shinde 2018	RCT	Low	Low	Low	Low	Low	Low	Low	Low
Singhal 2018	QE	Low	High	Low	High	High	Unclear	Low	Unclear
Sinha 2021a	RCT	Low	Unclear	Low	Unclear	Unclear	Low	Low	Low
Sinha 2021b	QE*	High	High	Low	High	High	Low	Low	Low
Telles 2013	RCT	Low	High	Low	High	Low	Low	Low	Low
Tol 2012	RCT	Low	High	Low	High	High	Low	Low	Low
Torrente 2019	RCT	Low	High	Unclear	High	High	Low	Unclear	Low
Wolmer 2005	QE	High	High	Low	High	High	Low	High	Low

Funnel plot

The Funnel plot in Figure 18 was used to visually explore publication bias. It shows that the risk of bias was significantly higher in the 34 LMIC's studies compared to the 56 HIC's studies.

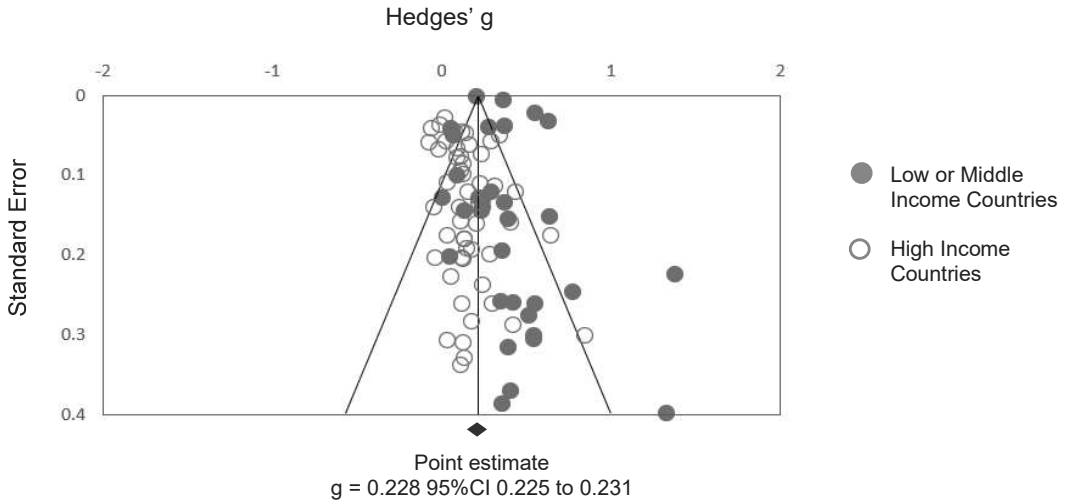

Figure 18: Funnel plot for random effects meta-analysis of adjusted standardised difference (g) in student outcomes, based on wellbeing intervention vs no intervention in HIC (white) and LMIC (grey)

Comparison of LMIC with similar HIC studies

Figure 19 shows the random effects meta-analysis of the student outcomes moderated by study design and context. It shows no difference in HIC contexts between quasi-experimental design (g = 0.146) and RCTs (g = 0.147). However, there is a significant difference in LMIC between quasi-experimental design (g = 0.506) and RCTs (g = 0.265). This suggests that in the context of LMIC's studies, quasi-experimental designs may be over-estimating the effectiveness of intervention when compared to studies that involve an RCT design.

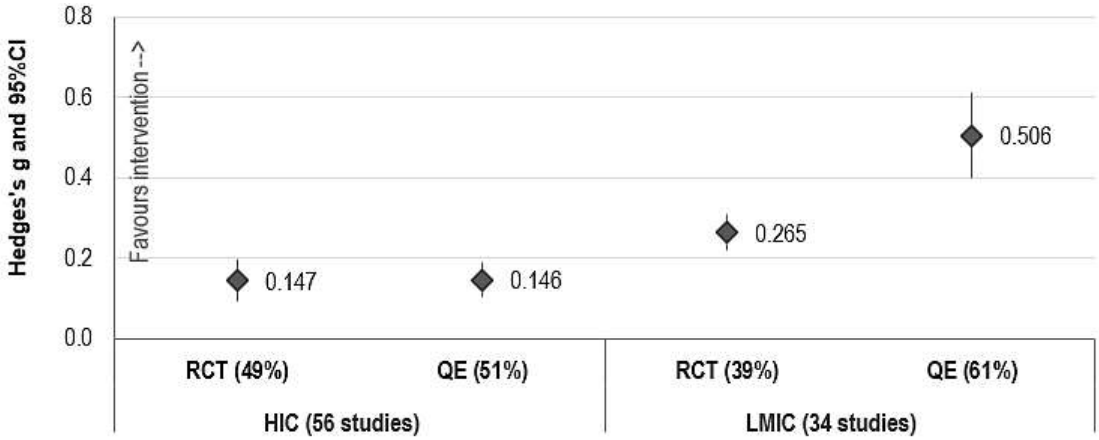

Figure 19: Random effects meta-analysis of the adjusted standardised mean difference in student outcomes moderated by study design (RCT vs QE) in HIC and LMIC

Appendix 5:
Summary results of LMIC meta-analysis

Forest Plot of student wellbeing and academic outcomes for the 34 LMIC's studies, arranged by intervention type. Hedges' g in **bold** indicates effect is significant p < 0.05.

	Wellbeing		Academic Readiness		Academic achievement	
Hedges'	g	SE	g	SE	g	SE
SOCIAL-EMOTIONAL SKILLS						
Aber 2017	0.036	0.032			0.079	0.046
Adler 2016b	**0.410**	0.008			**0.340**	0.008
Adler 2016f	**0.240**	0.008			**0.190**	0.008
Adler 2016l	**0.590**	0.023			**0.530**	0.023
Baumsteiger 2022	**0.821**	0.036	**0.457**	0.033		
Berger 2018	**0.802**	0.153	**0.591**	0.151	0.152	0.148
Harrison 2017			0.097	0.058	**0.114**	0.058
McMullen 2018	**0.387**	0.155	**0.454**	0.155		
Shinde 2018	0.010	0.084	0.020	0.170		
Singhal 2018	**1.290**	0.221	**1.926**	0.241		
Torrente 2019	0.025	0.040	0.090	0.040	0.103	0.063
Wolmer 2005	0.193	0.139			**0.433**	0.140
BEHAVIOURAL COGNITIVE SKILLS						
Baker-Henningham 2012	**0.387**	0.134	**0.376**	0.134		
Diken 2010	**0.927**	0.416	**0.961**	0.418		
Guzmán 2015	0.037	0.023	**0.804**	0.026		
Kaesornsamut 2012	**0.545**	0.260	**0.606**	0.261		
Karbasdehi 2019	**1.568**	0.440	**1.524**	0.435	**1.724**	0.449
Lan 2018	**0.667**	0.196	0.357	0.192		
Ozan 2018			0.446	0.297	**0.663**	0.302
Paeezy 2010	**1.104**	0.383			**1.577**	0.409
Tol 2012	0.143	0.100	0.132	0.100		
PHYSICAL ACTIVITY & RELAXATION						
Agrawal 2013	**0.670**	0.305	0.222	0.297		
Anusuya 2021	0.460	0.259	0.208	0.256	**0.587**	0.260
Bakir 2017	0.396	0.222			0.423	0.222
Barboza 2021			0.479	0.258	0.246	0.255
Bhardwaj 2017	0.355	0.383	0.398	0.384		
Çalik 2018	**0.274**	0.132			0.245	0.132
Gonçalves 2017	**0.866**	0.175			**0.697**	0.172
Gulati 2018	0.101	0.117	0.218	0.118	**0.541**	0.125
Jarraya 2019	**1.982**	0.438	**1.094**	0.382		
Kiani 2017	**1.767**	0.422	0.149	0.356		
Sinha 2021a	0.197	0.128			**0.328**	0.127
Sinha 2021b	0.162	0.143			**0.493**	0.149
Telles 2013	0.245	0.201			-0.129	0.201

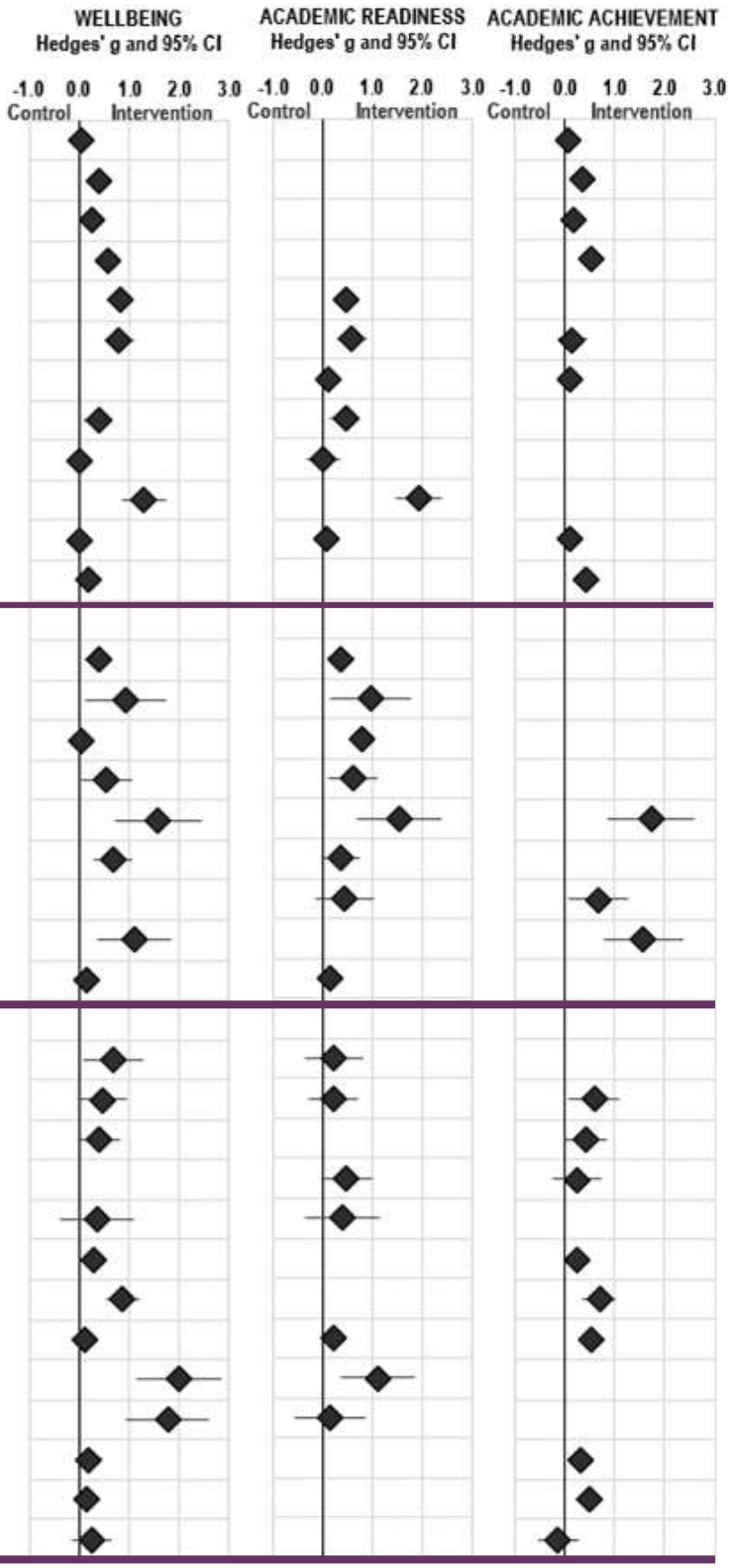

Figure 20: Student wellbeing outcomes in LMIC