

Review: School-based interventions to improve mental health literacy and reduce mental health stigma – a systematic review

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Background: The steadily increasing prevalence of mental disorders in children and adolescents presents itself as a public health challenge, especially given the health, social and economic burden of mental disorders. School-based interventions aimed at improving mental health literacy and reducing mental health stigma have the potential to prevent mental disorders and promote mental well-being, thus reducing the burden of mental disorders. This review identified and synthesised evidence on the effectiveness of school-based interventions designed to improve mental health literacy and reduce mental health stigma. **Methods:** Electronic bibliographic databases including MEDLINE, Embase, PsycINFO, Education Resources Information Center (ERIC), Child Development and Adolescent Studies, British Education Index and Applied Social Sciences Index and Abstracts (ASSIA) were searched. Randomised controlled trials (RCTs) were included if they assessed the effectiveness or cost-effectiveness of school-based intervention aimed at improving mental health literacy and reducing mental health stigma for children and young people aged 4–18 years. Quality of studies was appraised using the EPHPP tool. A numerical summary and a narrative description of the findings in relation to the research questions were synthesised. This systematic review was registered with PROSPERO (CRD42020191265). **Results:** We identified 21 studies describing 20 unique school-based mental health interventions. Overall, there is moderate evidence suggesting that school-based mental health interventions can be effective in improving mental health literacy and reducing mental health stigma defined as attitudes and beliefs regarding mental disorders. However, there is less evidence for their long-term effectiveness, as most studies did not include follow-ups. **Conclusions:** Despite exclusively including studies with randomised designs, intervention and methodological heterogeneity poses uncertainties to any conclusions made. Future research should focus on resolving methodological issues concerning how outcomes are assessed and include process evaluations to better inform the design of an intervention in term of its delivery and implementation.

Key Practitioner Message

- One in eight children and young people aged 5 to 19 years have at least one mental disorder. Research shows that low perceived need and attitudinal barriers are the main barriers to mental health treatment. Improving mental health literacy and reducing stigma may facilitate help-seeking and use of mental health services by young people.
- School-based interventions can improve mental health literacy and reduce stigma in the short term; however, refresher interventions may be required to sustain the positive outcomes in the long term.
- Interventions comprising mental health education followed by contact with a person with lived experience of mental disorders may be most effective. Live contact and filmed contact are equally effective.

Keywords: School; mental health; intervention; stigma; education

Introduction

Mental disorders can be defined as behavioural or psychological syndrome or pattern that occurs in an individual reflecting an underlying psychobiological dysfunction and leading to clinically significant distresses or disabilities that is not merely an expected response to common stressors and losses or a culturally sanctioned response to a particular event (American Psychiatric Association, 2013). In the United Kingdom, one in eight children and young people aged 5–19 years have at least one mental disorder (Sadler, Vizard, Ford,

Goodman, et al., 2018; Sadler, Vizard, Ford, Marcheselli, et al., 2018). The overall prevalence has seen a slight increase in 2017 when compared with the previous survey in 2004, which saw an overall prevalence of 10% (Green, McGinnity, Meltzer, Ford, & Goodman, 2005). Research has found that around 50% of all lifetime cases commence by 14 years of age and 75% of cases by 24 years (Kessler et al., 2005). Recent research indicates that the COVID-19 pandemic may lead to further deterioration in people's mental health (MH), potentially because of increased social isolation and loneliness (Holmes et al., 2020; Pierce et al., 2020). The steadily

increasing prevalence of mental disorders among children and young people is a concern, having serious adverse consequences both at an individual and a societal level. Mental disorders can have immediate effects on those who experience them, such as functional impairment to their daily lives and lower educational achievement, but can also have long-term negative effects on physical and MH during adulthood (Patel, Flisher, Hetrick, & McGorry, 2007; Sawyer et al., 2012). On a societal level, ongoing mental disorders may translate into long-term negative social and economic outcomes, such as poorer quality of life, lost work productivity and increased costs to health services. Indeed, it is estimated that ill mental health can cost health services £70–100 billion per year in the United Kingdom (Henderson & Madan, 2014; Simon, 2003). Moreover, it is important to consider MH as a continuum – MH is not simply the absence of mental disorders, but also the syndrome of symptoms of positive feelings and positive functioning in life (Keyes, 2002). It is therefore important to not only prevent the absence of MH, but also promote the presence of positive MH.

From a public health perspective, interventions that prevent mental disorders and promote mental well-being are an important strategy to reduce the health, social and economic burden of mental disorders (Arango et al., 2018). Schools are particularly important as a setting for interventions, since most children and young people spend a large amount of their time at school, and school staff are often the first port of call for children and young people in need of help and advice about their MH (Abdinasir, 2019). Schools can reach children and young people from marginalised groups who experience higher rates of mental disorders (Green et al., 2005), and improve the overall accessibility of MH services (Thorley, 2016). Schools also provide a good opportunity for MH education, as children lack knowledge of mental disorders and MH stigma can develop early, with children often associating mental disorders with unpredictability and violence (Lovett, Tamkin, & Fletcher, 2011). Therefore, there is a need to improve mental health literacy, which is defined as ‘the knowledge and beliefs about mental disorders which aid their recognition, management or prevention’ (Jorm et al., 1997). Moreover, as low perceived need and attitudinal barriers were found to be the main barriers to MH treatment (Andrade et al., 2014; Mojtabei et al., 2011), improving MH literacy and reducing stigma may help overcome these barriers and increase access and use of MH services when needed. This is also important for reducing the negative consequences of MH stigma, including but not limited to one’s self-esteem, social opportunities, as well as work and living opportunities (Corrigan, 2000).

Two previous reviews have focused on school-based programmes aimed at improving MH literacy and reducing MH stigma (Mellor, 2014; Wei, Hayden, Kutcher, Zygmunt, & McGrath, 2013). Both reviews included non-randomised controlled trials, controlled before-after studies and quasi-experimental studies alongside randomised controlled trials (RCTs); Wei and colleagues also focused on a slightly different but overlapping population (those who are 12–25 years of age). Due to the heterogeneity in study design and interventions included, it was not possible for either review to conduct a meta-analysis. It is therefore important to focus on

only RCTs, as including controlled, high-quality studies can provide more definitive answers to questions about effectiveness of different school-based programmes for improving MH literacy and reducing MH stigma (Howick et al., 2011).

Aim and research questions

The aim of this systematic literature review was to synthesise and appraise the evidence from RCTs that examine the effectiveness of school-based MH literacy interventions and stigma reduction programmes. The specific review questions are:

- 1 Are school-based MH literacy interventions effective in improving pupils’ MH literacy?
- 2 Are school-based MH literacy interventions effective in reducing MH stigma?

Methods

The protocol was prospectively registered with International Prospective Register of Systematic Reviews (PROSPERO; www.crd.york.ac.uk/prospero) on 9 June 2020, registration number: CRD42020191265 (amended version dated 21 July 2020).

Search strategy and selection criteria

Electronic bibliographic databases including MEDLINE, and Embase via OvidSP, PsycINFO, ERIC, Child Development and Adolescent Studies and British Education Index via EBSCOhost, and ASSIA via ProQuest were first searched on 25 June 2020, and the searches were updated on 28 June 2021. The search strategy comprised of terms for MH education and school settings combined with terms for RCTs. For an example of the full search strategy see Appendix S1. Additional studies were identified through forward citation searching of reference lists of included studies and that of relevant, previously published reviews (Mellor, 2014; Wei et al., 2013). Inclusion criteria for studies are shown in Table 1.

Study selection

Search results were managed using CADIMA (Kohl et al., 2018; www.cadima.info/index.php). Search results were merged, and duplicate records were removed. The study selection process comprised of two stages: (1) titles and abstracts were first examined, and studies that were obviously irrelevant were excluded; (2) full texts of the remaining, potentially relevant papers were retrieved and examined against the inclusion and exclusion criteria. All records were screened by one author (KKYM), and 20% of the records were screened in parallel by two additional reviewers (A-MB, JKA) at both stages. The kappa value for interrater agreement was 0.87 for title and abstracts, and 0.91 for full texts, and any disagreements were resolved by discussion.

Data extraction

The data extraction form was developed based on the data collection checklist by a review group of The Cochrane Collaboration (Cochrane Effective Practice and Organisation of Care (EPoC), 2017) and the template for intervention description and replication (TiDieR; Hoffmann et al., 2014). Multiple reports of the same study were linked.

Quality appraisal

The risk of bias in the included studies was appraised using the Effective Public Health Project Practice (EPHPP) Quality Assessment Tool for Quantitative Studies (Thomas, Ciliska, Dobbins, & Micucci, 2004; <https://merst.ca/ephpp/>). The EPHPP checklist was completed for each of the included studies by one author (KKYM), and a 20% check was conducted by two

Table 1. Inclusion criteria

Criteria	Specification
Population	Children and young people aged 4–18 years, to include all school-aged children and young people before they enter higher education.
Intervention	Interventions (including curriculum-based, PSHE) delivered in school setting aiming to improve MH literacy, knowledge and understanding of mental disorders, and reduce stigma.
Comparator	Alternative intervention or no intervention at all (practice as usual).
Outcomes	Effectiveness of the intervention in improving the following outcomes, considered based on pre- and post- intervention measures: <ul style="list-style-type: none"> Knowledge and awareness of mental disorders, as well as their ability to recognise signs and symptoms of mental disorders Levels of MH stigma, defined as one's attitudes and beliefs about mental disorders, their emotional responses, as well as behavioural intentions, towards people with mental disorders
Setting	Primary and secondary educational settings. This includes state, public and independent schools or colleges of further education and non-mainstream settings.
Study design	Randomised controlled trials (any design e.g. cluster, double blinded etc.)
Country	Any
Date	From the earliest available
Language	English language

MH, Mental health; PSHE, Personal, Social, Health and Economic education.

additional reviewers (A-MB, JKA). Ratings were compared, and disagreements were resolved by discussion.

Synthesis of results

Due to the heterogeneity and the quality of the outcome measures included, it was not possible for either review to conduct a meta-analysis. A numerical summary and narrative description of findings is provided. The narrative description of findings was guided by the narrative synthesis framework (Popay et al., 2006). Findings are described separately for each review question.

Results

Study and intervention characteristics

A total of 3107 records were identified and any duplicates were first removed, after which, 2666 unique studies were screened at the title and abstract level, 80 screened at the full-text level. Twenty-two studies describing 21 unique interventions, were included in the final review (see Figure 1). Characteristics of included studies are shown in Table 2. Most of the studies were conducted after year 2010 ($n = 17$), and most were conducted in Western countries, including the United States, Europe, Australia and Canada ($n = 17$). The studies sampled a total of 27,122 participants, including 26,107 secondary students and 1015 primary students. Most of the interventions addressed MH literacy and stigma in general ($n = 15$), whilst a few of them focused on schizophrenia and psychosis ($n = 4$), and depression and suicide ($n = 3$). All interventions incorporated an education element, whilst some of the interventions incorporated contact with people with experience of mental disorders ($n = 9$). A detailed description of the study characteristics can be found in Table S1 and details of intervention characteristics based on TIDieR framework (Hoffmann et al., 2014) can be found in Table S2. An overview of the findings can be found in Figure 2.

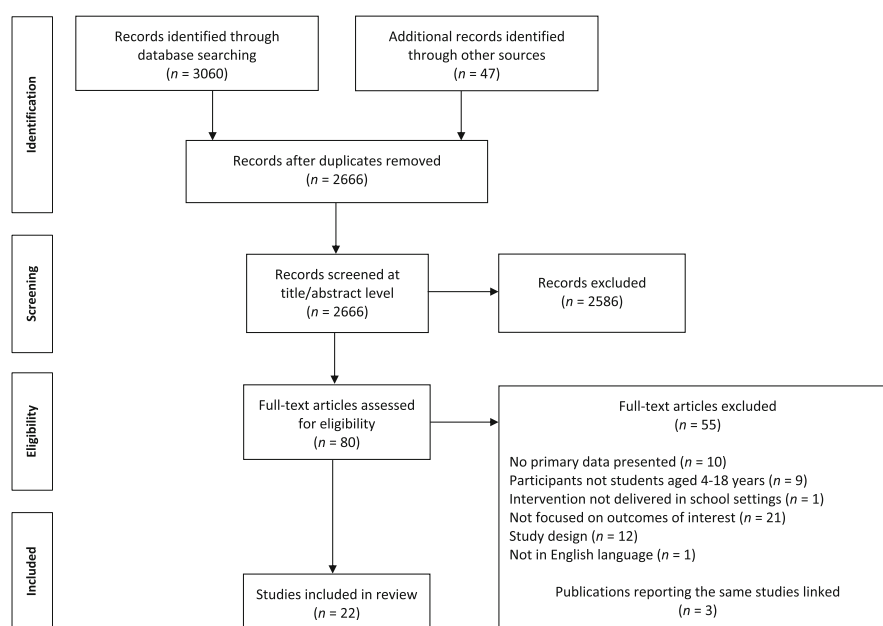
**Figure 1.** Study selection and exclusion flow diagram

Table 2. Characteristics of included studies

Criteria	Characteristics	No. of studies (<i>n</i> total = 22)
Year	1991–2000	2
	2001–2010	3
	After 2010	17
Country	US	7
	Europe	4
	Australia	3
	Canada	3
	Hong Kong	1
	Israel	1
	Japan	1
	Pakistan	1
	Vietnam	1
Population (School level)	Primary school	2
	Secondary school	20
Focus of intervention	MH literacy and stigma in general	15
	Schizophrenia and psychosis	4
	Depression and suicide	3
Comparator	Alternative interventions	13
	No interventions at all	9
Outcomes ^a	<i>Mental health literacy</i>	
	Knowledge and awareness of mental disorders	15
	Ability to recognise signs and symptoms of mental disorders	5
	<i>Mental health stigma</i>	
	Attitudes and beliefs regarding mental disorders	15
	Emotional responses towards people with mental disorders	4
	Behavioural intentions towards people with mental disorders	9
Number of outcome measurements	Pre- and post-intervention only	9
	One further timepoint	9
	Two further timepoints	3
	Four further timepoints	1
Length of follow-up period	Post-intervention only	9
	1-month	1
	2-month	3
	2.5-months	1
	4-months	2
	6-months	2
	12-months	2
	24-months	1
	30-months	1

^aOutcomes do not add up to 22 as each study can measure multiple outcomes.

Quality of included studies

Quality ratings for the included studies are provided in Table 3. The overall methodological quality of included studies was moderate, with four studies rated strong, 11 studies rated moderate and six studies rated weak. All studies were rated strong in study design, as all were RCTs in which the participants were randomly allocated to the intervention or control group. The majority of the studies were rated strong in term of data collection methods (*n* = 12), having used valid and reliable outcome measurement tools, as well as in terms of

confounders as any important differences between groups prior to the intervention were controlled (*n* = 19). Most studies were rated moderate in terms of the blinding category (*n* = 13), as studies differed in whether the participants were aware of the research question, even though all the participants were unaware of their allocation to either intervention or control group.

Five studies included process evaluation by considering the implementation fidelity of the interventions (Chisholm et al., 2016; Link et al., 2020; Nguyen, Dang, Bui, Phoeun, & Weiss, 2020; O'Mara et al., 2013; Painter et al., 2017; Pinto-Foltz, 2009; Pinto-Foltz, Logsdon, & Myers, 2011). Implementation fidelity was assessed by checklists specifically developed for the purpose for the specific interventions in all studies. Four studies reported high level of fidelity (Chisholm et al., 2016; Link et al., 2020; Nguyen et al., 2020; Painter et al., 2017; Pinto-Foltz, 2009; Pinto-Foltz et al., 2011), while one study only reported the methods used for process evaluation but not the results (O'Mara et al., 2013).

Mental health literacy

Knowledge and awareness of mental disorders. Fifteen studies addressed knowledge and awareness of mental disorders (Ahmad, Leventhal, Nielsen, & Hinshaw, 2020; Aseltine & DeMartino, 2004; Chan, Mak, & Law, 2009; Chisholm et al., 2016; DeLuca, 2020b; DeLuca, Tang, Zoubaa, Dial, & Yanos, 2020; Klingman & Hochdorf, 1993; Link et al., 2020; Milin et al., 2016; Nguyen et al., 2020; Painter et al., 2017; Perry et al., 2014; Pinto-Foltz, 2009; Pinto-Foltz et al., 2011; Rahman, Mubbashar, Gater, & Goldberg, 1998; Swartz et al., 2017; Teesson et al., 2020; Yamaguchi et al., 2020).

Six studies found statistically significant increases in knowledge and awareness of mental disorders (*p*-values ranging from <.001 to <.05; Ahmad et al., 2020; Aseltine & DeMartino, 2004; Chisholm et al., 2016; Klingman & Hochdorf, 1993; Milin et al., 2016; Nguyen et al., 2020). Four studies included follow-up measurements and found statistically significant improvements at post-intervention, and also at 1-month (*n* = 1; Chan et al., 2009), 2-months (*n* = 1; Yamaguchi et al., 2020), 1- and 2-months (*n* = 1; DeLuca, 2020b; DeLuca et al., 2020) and 6-months (*n* = 1; Perry et al., 2014) follow-up. Results suggest that improvements were retained for at least 6 months, although all four studies found that MH knowledge dropped to a lower level from post-intervention to follow-up (Chan et al., 2009; DeLuca, 2020b; DeLuca et al., 2020; Perry et al., 2014; Yamaguchi et al., 2020). Of these, three studies incorporated live contact with people with experience of mental disorders alongside educational content in the intervention (Chisholm et al., 2016; DeLuca, 2020a, 2020b; Link et al., 2020; Painter et al., 2017), and three studies incorporated filmed contact (Aseltine & DeMartino, 2004; Chan et al., 2009; Milin et al., 2016). One study (Teesson et al., 2020) reported mixed results, with significant improvements when compared to alternative intervention (*p*-values ranging from <.0001 to .0014) but not usual health classes. One study (Pinto-Foltz, 2009; Pinto-Foltz et al., 2011) found no significant differences in knowledge and awareness of mental disorders.

Three studies combined findings on MH knowledge with MH stigma (Link et al., 2020; Painter et al., 2017;

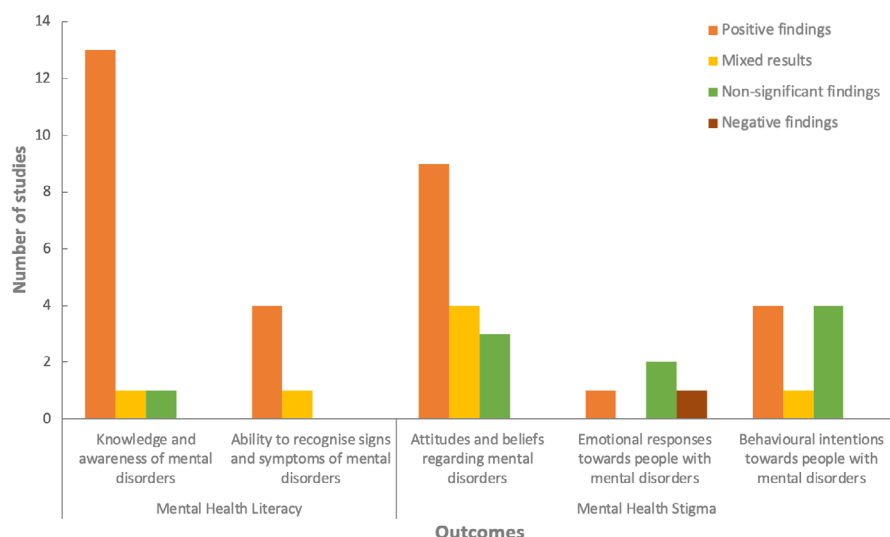


Figure 2. Overview of the findings for each outcome measure

Table 3. Quality of included studies

Study	Component ratings						Overall rating ^a
	Selection bias	Study design	Confounders	Blinding	Data collection methods	Withdrawals and drop outs	
Ahmad et al. (2020)	Moderate	Strong	Strong	Strong	Weak	Weak	Weak
Aseltine and DeMartino (2004)	Moderate	Strong	Strong	Moderate	Strong	Strong	Strong
Campbell et al. (2011)	Weak	Strong	Weak	Strong	Strong	Moderate	Weak
Chan et al. (2009)	Moderate	Strong	Strong	Moderate	Strong	Moderate	Strong
Chisholm et al. (2016)	Moderate	Strong	Strong	Strong	Strong	Strong	Strong
DeLuca (2020) and DeLuca et al. (2020)	Strong	Strong	Strong	Moderate	Strong	Strong	Strong
Economou et al. (2012)	Strong	Strong	Strong	Moderate	Weak	Strong	Moderate
Economou et al. (2014)	Moderate	Strong	Strong	Moderate	Weak	Strong	Moderate
Hart et al. (2018)	Strong	Strong	Strong	Moderate	Weak	Moderate	Moderate
Klingman and Hochdorf (1993)	Moderate	Strong	Weak	Moderate	Weak	Weak	Weak
Milin et al. (2016)	Strong	Strong	Strong	Strong	Weak	Strong	Moderate
Nguyen et al. (2020) – Vietnam study only	Strong	Strong	Strong	Moderate	Weak	Strong	Moderate
O'Mara et al. (2013)	Weak	Strong	Strong	Moderate	Strong	Strong	Moderate
Painter et al. (2017) and Link et al. (2020)	Moderate	Strong	Strong	Strong	Weak	Strong	Moderate
Perry et al. (2014)	Weak	Strong	Strong	Moderate	Strong	Weak	Weak
Pinto-Foltz (2009) and Pinto-Foltz et al. (2011)	Weak	Strong	Weak	Moderate	Strong	Strong	Weak
Pitre et al. (2007)	Weak	Strong	Strong	Strong	Strong	Strong	Moderate
Rahman et al. (1998)	Strong	Strong	Strong	Moderate	Weak	Strong	Moderate
Saporito et al. (2011)	Moderate	Strong	Strong	Moderate	Strong	Weak	Moderate
Swartz et al. (2017)	Moderate	Strong	Strong	Strong	Strong	Weak	Moderate
Teesson et al. (2020)	Weak	Strong	Strong	Strong	Strong	Moderate	Moderate
Yamaguchi et al. (2020)	Strong	Strong	Strong	Strong	Weak	Strong	Moderate

^aThe overall rating was determined by assessing the rating of the six components according to the protocol for the Effective Public Health Project Practice (EPHPP) Quality Assessment Tool for Quantitative Studies (Thomas et al., 2004; <https://merst.ca/ephpp/>).

Rahman et al., 1998) and MH knowledge with the ability to recognise signs and symptoms of mental disorders (Swartz et al., 2017). These combined measures showed significant improvement from pre- to post-intervention (p -values ranging from $<.01$ to $<.05$ and $p < .001$, respectively).

Ability to recognise signs and symptoms of mental disorders. Five studies evaluated the impact of interventions on the participants' ability to recognise signs and symptoms of mental disorders (Chisholm et al.,

2016; Hart et al., 2018; Painter et al., 2017; Swartz et al., 2017; Yamaguchi et al., 2020). The outcome was assessed by asking the participants questions about the characters depicting mental disorders in vignettes (e.g. Jorm et al., 1997). Three studies found statistically significant improvements in the ability to recognise signs and symptoms of mental disorders (p -values ranging from $<.001$ to $<.01$; Chisholm et al., 2016; Painter et al., 2017; Yamaguchi et al., 2020). Two of these studies incorporated live contact with people with experience of mental disorders (Chisholm et al., 2016; Link et al.,

2020; Painter et al., 2017). Hart et al. (2018) found statistically significant improvements in the identification of mental disorders in the vignette featuring fictional adolescents with social anxiety ($p < .001$) but not that of depression and suicidality.

Mental health stigma

Attitudes and beliefs regarding mental disorders. Sixteen studies addressed MH stigma defined as attitudes and beliefs regarding mental disorders (Ahmad et al., 2020; Aseltine & DeMartino, 2004; Chan et al., 2009; DeLuca, 2020b; DeLuca et al., 2020; Economou et al., 2012, 2014; Hart et al., 2018; Link et al., 2020; Milin et al., 2016; Nguyen et al., 2020; Painter et al., 2017; Perry et al., 2014; Pinto-Foltz, 2009; Pitre, Stewart, Adams, Bedard, & Landry, 2007; Rahman et al., 1998; Saporito, Ryan, & Teachman, 2011). All studies assessed explicit stigma, while Saporito et al.'s (2011) was the only study that assessed implicit stigma. Explicit stigma is defined as negative attitudes and beliefs that are conscious, controllable and reflective, while implicit stigma refers to negative attitudes and beliefs that are subconscious, automatic and intuitive (Stier & Hinshaw, 2007).

Six studies reported statistically significant reductions in MH stigma over time (Aseltine & DeMartino, 2004; Economou et al., 2012, 2014; Hart et al., 2018; Milin et al., 2016; Nguyen et al., 2020). Six studies found statistically significant reductions in stigmatising attitudes and beliefs (p -values ranging from $<.0001$ to $.034$; Aseltine & DeMartino, 2004; Economou et al., 2014; Hart et al., 2018; Milin et al., 2016; Nguyen et al., 2020). Only one study, Economou et al. (2012), included follow-up measurements and found statistically significant improvements in attitudes and beliefs at post-intervention and also at 12-months follow-up (all p -values $< .01$). A comparison of stigmatising attitudes and beliefs at post-intervention and follow-up suggests gradual worsening, however improvements were sustained for at least 12 months. Three of these studies incorporated contact with people with experience of mental disorders, one in which contact was in-person (Link et al., 2020; Painter et al., 2017) and the other two in which contact was filmed (Aseltine & DeMartino, 2004; Milin et al., 2016).

Two studies found different results at post-intervention and follow-up: Chan et al. (2009) found significant improvements in attitudes and beliefs only at post-intervention ($p < .05$) but not at 1-month follow-up, while Perry et al. (2014) found the reverse, that is no improvement post-intervention but significant improvements at 6-months follow-up ($p < .05$). Two studies found reported different results with different measures (DeLuca, 2020b; DeLuca et al., 2020; Pitre et al., 2007): DeLuca and colleagues found that the intervention group had significantly reduced stigma scores on Attitudes about Mental Illness and its Treatment Scale ($p = .014$), but not the Attitudes Toward Serious Mental Illness – Adolescent Version ($p = .892$); Pitre and colleagues found that intervention groups had significant improvements on the Separatism ($p < .01$), Restrictiveness ($p < .005$) and Stigmatisation ($p < .025$) subscales of the Opinions about Mental Illness Scale but not the Benevolence, Stereotyping and Pessimistic Prediction subscales (all $ps > .01$). Three studies found no significant differences in attitudes and beliefs regarding

mental disorders (Ahmad et al., 2020; Pinto-Foltz, 2009; Saporito et al., 2011).

Emotional responses towards people with mental disorders. Four studies addressed MH stigma defined as emotional responses towards people with mental disorders (Campbell, Shryane, Byrne, & Morrison, 2011; DeLuca, 2020b; DeLuca et al., 2020; O'Mara et al., 2013; Pinto-Foltz, 2009; Pinto-Foltz et al., 2011). Emotional responses towards people with mental disorders was measured in these studies by different versions of the Attribution Questionnaire (AQ; e.g. Corrigan, Markowitz, Watson, Rowan, & Kubiak, 2003; Watson et al., 2004), which is a standardised Likert-style questionnaire with established validity and reliability.

One study, O'Mara et al. (2013), unexpectedly reported statistically significant increases in negative emotional responses towards people with mental disorders from pre-intervention to post-intervention in both intervention and control groups ($p < .05$). Campbell et al. (2011) incorporated live contact with people with mental disorders in the intervention and found that the intervention group had significantly reduced stigma from pre- to post-intervention ($p = .03$), but there were no significant differences at 2.5-months follow-up. This suggests that the effects of the intervention were not sustained beyond immediate post-intervention. Two studies found no significant differences in emotional responses towards people with mental disorders from pre- to post-intervention and follow-up (DeLuca, 2020b; DeLuca et al., 2020; Pinto-Foltz, 2009; Pinto-Foltz et al., 2011).

Behavioural intentions towards people with mental disorders. Nine studies addressed MH stigma defined as behavioural intentions towards people with mental disorders (Ahmad et al., 2020; Chan et al., 2009; Chisholm et al., 2016; DeLuca, 2020b; DeLuca et al., 2020; Economou et al., 2012, 2014; Hart et al., 2018; Link et al., 2020; Painter et al., 2017; Swartz et al., 2017). Four studies reported statistically significant improvement of behavioural intentions towards people with mental disorders over time (p -values ranging from $<.001$ to $<.05$; Chan et al., 2009; Economou et al., 2012, 2014; Link et al., 2020). Two of these studies incorporated contact with people with experience of mental disorders, one in which contact was live (Link et al., 2020; Painter et al., 2017) and the other was filmed (Chan et al., 2009). Results suggest that reductions in social distance may sustain 12–18 months post intervention (Chan et al., 2009; Link et al., 2020); however, Economou et al. (2012) found that the improvement of behavioural intentions towards people with mental disorders were not sustained at 12-months follow-up. One study found mixed results, as significant improvement was observed with one of the vignettes only ($p < .001$) but not the other ($p = .056$; Hart et al., 2018). Four studies found no significant differences in behavioural intentions towards people with mental disorders (Ahmad et al., 2020; Chisholm et al., 2016; DeLuca et al., 2020; Swartz et al., 2017).

Discussion

Summary of findings

The aim of this review was to synthesise and appraise evidence for effectiveness of school-based MH literacy

interventions and stigma reduction programmes. We identified 22 studies describing 21 unique interventions in the final review. There is moderate evidence suggesting that school-based MH interventions can be effective in improving MH literacy and reducing MH stigma, as more than half of the studies that investigated these outcomes reported statistically significant improvements. However, there is less evidence for their long-term effectiveness, as most studies only assessed outcomes immediately after the intervention and did not include follow-ups.

Quality of evidence

All studies were rated strong in terms of study design, owing to the randomised design. Only just over half of the studies clearly described the method of randomisation, hence the risk of selection bias cannot be fully eliminated. Moreover, around half of the studies were rated weak in terms of the quality of data collection method as they used non-standardised and non-validated measures. This is particularly prominent for measures of the ability to recognise signs and symptoms of mental disorders. Additionally, the quality of standardised measurement tools also affects the quality of data collection methods, and the quality of these tools may vary according to different measurement properties, for example the Mental Health Knowledge Schedule has great content validity but poor internal consistency (Wei, McGrath, Hayden, & Kutcher, 2016).

Comparison to previous studies

Our review reported a similar rate of improvement of MH literacy and reduction of MH stigma to previous reviews (Mellor, 2014; Wei et al., 2013). We found limited evidence to support their long-term effectiveness of MH literacy interventions and stigma reduction programmes as most studies only assessed outcomes immediately after the intervention and did not include follow-ups. Different studies may have come to different conclusions due to intervention heterogeneity, including the theoretical underpinning behind the design of the interventions and its delivery, including the providers, duration and schedule. For example, the MH literacy of those who delivered the intervention was found to be significantly associated with students' MH knowledge post-intervention, hence might have contributed to and affected by the effectiveness of the interventions (Miller et al., 2019). All studies considered both male and female participants at secondary schools, apart from two studies which included the participants from primary schools (Link et al., 2020; Painter et al., 2017; Pitre et al., 2007), and another study included female adolescents only (Pinto-Foltz, 2009; Pinto-Foltz et al., 2011). The heterogeneity in socio-economic demographics of the participants plays a crucial factor in understanding the results, as the participants with different demographic characteristics were found to have different socio-emotional developmental trajectories and these trajectories may also respond to school-based interventions differently (Aber, Brown, & Jones, 2003).

Many of the interventions in the included studies incorporated contact with people with lived experience of mental disorders, but came to rather different, and sometimes contradictory conclusions with regards to the role of contact. This approach is based on the intergroup

contact theory, which suggests that cross-group interactions, and hence interactions with commonly stigmatised groups, may reduce prejudice (Allport, 1954; Pettigrew, 1998). Our results showed that the medium of contact, whether it was live or filmed, did not predict whether an intervention was effective or not, as there was an equal number of interventions that incorporated live contact (Chisholm et al., 2016; DeLuca, 2020b; DeLuca et al., 2020; Link et al., 2020; Painter et al., 2017) or filmed contact (Aseltine & DeMartino, 2004; Chan et al., 2009; Milin et al., 2016) amongst those that were effective. This is in line with other studies in the literature that found that live contact and filmed contact are equally effective (Clement et al., 2012). This has important implications for the development of digital interventions.

Comparing the effects of contact with that of education, Painter et al. (2017) found significant improvements in knowledge and attitudes in the intervention group that received the curriculum only but not the intervention group that received contact only. This is in line with Corrigan, Morris, Michaels, Rafacz, and Rüsch (2012), who found that contact is better than education at reducing stigma in adults, while education is better than contact at reducing stigma in adolescents. It might be possible that beliefs about mental disorders in adolescents are not as firmly developed as in adults, hence adolescents are more responsive to changes through education (Corrigan et al., 2012). Alternatively, contact might be less effective in adolescents due to the differences in status between the people providing contact and the adolescents who are receiving it during the intervention, as equal group status within the situation was found to be crucial for positive effects of intergroup contact to occur (Pettigrew, 1998). Interestingly, Chan et al. (2009) found that those receiving education before video-based contact (education-video) showed greater improvements in MH literacy and MH stigma than those who received interventions in reverse order (video-education) and the control group (Chan et al., 2009). These suggest that MH education may have laid the foundation for young people to better understand and process the subsequent experience of contacting people with lived experience of mental disorders.

Results revealed that a greater proportion of studies found statistically significant improvements when MH literacy was conceptualised and operationalised as the ability to recognise signs and symptoms of mental disorders, instead of knowledge and awareness of mental disorders, although fewer studies investigated symptom recognition abilities. This may be explained by the differences in the learning process involved in these abilities. Therefore, it is possible that school-based MH literacy interventions were effective in enhancing the learning of one of these abilities but not both. Similarly, a greater proportion of studies found statistically significant improvements when MH stigma was conceptualised and operationalised as attitudes and beliefs regarding mental disorders, rather than as emotional responses and behavioural intentions towards people with mental disorders. This echoes with studies emphasising that not all dimensions of MH stigma are equal, calling for a more comprehensive way of conceptualising and operationalising stigma to encompass its multidimensional nature (DeLuca, 2020a; Pescosolido & Martin, 2015). The

scarcity of studies that have included implicit stigma in the conceptualisation and operationalisation of MH stigma may have inflated the number of positive results. This is because the correlation between explicit and implicit measures is generally rather low (Dabby, Tranulis, & Kirmayer, 2015; Stier & Hinshaw, 2007), and implicit attitudes have been found to be harder to change when compared to explicit attitudes (Sandhu, Arora, Brasch, & Streiner, 2019). Therefore, it is possible that school-based MH literacy interventions were only effective in reducing explicit stigma but not implicit stigma. Overall, the lack of standardised definitions for MH literacy and MH stigma continue to pose challenges for their conceptualisation and operationalisation (Fox, Earnshaw, Taverna, & Vogt, 2018), and may limit any conclusions made about the effects of the interventions in MH literacy and MH stigma.

Strengths and limitations

This is the first systematic review to include only randomised controlled trials that assessed the effectiveness of school-based MH education interventions in improving MH literacy and reducing MH stigma among children and young people. An obvious strength of this review is the exclusive inclusion of studies with randomised designs. Due to their methodological strengths, their internal validity is high. Moreover, the broad inclusion criteria in other aspects, particularly in terms of the age group of the study population, mental disorders targeted by the interventions and the outcomes assessed in this review, allow for a comprehensive synthesis of evidence for the effectiveness of school-based interventions aimed at improving MH literacy and reducing MH stigma.

Nevertheless, this review also has a few limitations. Firstly, studies written in foreign languages, as well as publications in the grey literature were not included. Second, this review is subject to publication bias and outcome reporting bias, and a further limitation is that these biases were not assessed in this review. Furthermore, the broad inclusion criteria may have contributed to making comparison across studies challenging. The lack of standardised definitions for MH literacy and MH stigma continues to pose challenges for their conceptualisation and operationalisation (Fox et al., 2018), and may limit any conclusions made about the effects of the interventions in MH literacy and MH stigma. The quality and heterogeneity of the outcome measures limits comparison between studies as well as strengths and generalisability of our conclusions. Therefore, it was not possible to carry out a meta-analysis or produce any statistical summaries of the results.

Directions for further research and practice

In order to better understand whether school-based interventions are effective in improving MH literacy and reducing MH stigma, future research should focus on developing standardised definitions of MH literacy and MH stigma to incorporate the multiple dimensions of these concepts. This will inform how to best operationalise and measure MH literacy and stigma outcomes, which is essential for reliable and valid assessment of the effectiveness of the programmes. An extensive definition of MH literacy should encompass not only knowledge of mental disorders and symptom recognition abilities, but also knowledge about

treatments, side effects and MH services (Wei et al., 2016). In a similar vein, a comprehensive definition of MH stigma should not only include public stigma, but should also include the attitudes and beliefs regarding mental disorders, emotional responses and behavioural intentions towards people with mental disorders. Additionally, a definition should include other less considered dimensions, such as perceived stigma, anticipated stigma, self-stigma, implicit stigma, as well as treatment and disclosure carryover aspects of stigma (DeLuca, 2020a; DeLuca et al., 2020). According to Pescosolido and Martin, treatment carryover is defined as 'the belief that public knowledge that an individual has received medical or psychological treatment for a stigmatised condition and/or status reduces the status of that individual in the larger community', while disclosure carryover is defined as 'the belief that admission to having a discreditable condition and/or status will engender negative responses from members of the larger community' (Pescosolido & Martin, 2015). A standardised definition of MH stigma that incorporates the different theories and models of stigma can also help make the evaluation of the validity of the measures less challenging, and hence a better and more valid evaluation of the intervention effectiveness (Wei et al., 2016).

Moreover, most of the included studies focused on outcome evaluation in the short term, with a few studies including outcome evaluation that assessed the long-term effects of the intervention and less than a fifth of the studies including process evaluation. Future research in the development of school-based MH interventions should focus on long-term outcome evaluations, including follow-up measurements on the effectiveness of the interventions, and also consider the incorporation of refresher interventions, in order to sustain the positive outcomes in the long term. Process evaluation should also be included to better understand how well an intervention is implemented and whether it was delivered as designed, and how well the programme is received and accepted by the target population (Oakley, Strange, Bonell, Allen, & Stephenson, 2006). Process evaluation may also help identify any contextual factors that may have affected both the implementation and the outcomes of the intervention, and therefore informs interpretation of the intervention outcomes (Moore et al., 2015).

Conclusion

This is the first known systematic review on school-based MH literacy and stigma reduction intervention that exclusively included studies with randomised designs. The findings show that there is moderate evidence for the effectiveness of school-based interventions in improving MH literacy and reducing MH stigma. However, the heterogeneity in intervention designs and methodological approaches concerning how the outcomes were conceptualised, operationalised and measured across the included studies, may limit any conclusions about the effects of the interventions. Future research should also focus on establishing standardised definitions of MH literacy and MH stigma. Process evaluations should be included in future studies of intervention effectiveness to better inform the design of

an intervention in term of its delivery and implementation.

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Ethical information

No ethical approval was required for this review article.

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Supporting information

Additional Supporting Information may be found in the online version of this article:

Appendix S1. Search History for Medline (via OvidSP).

Table S1. Study characteristics.

Table S2. Intervention characteristics.

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