Intervention programs targeting the mental health, professional burnout, or wellbeing of school teachers: A systematic review and meta-analyses

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Abstract

This paper outlines a systematic review and meta-analyses to identify, describe, and evaluate randomised and non-randomised controlled trials of psychological programs targeting the mental health, professional burnout, or wellbeing of school classroom teachers. Eighty-two unique studies were identified for inclusion in the review, and of those 39 were included in the meta-analyses (19 randomised controlled trials). In randomised controlled trials, the programs examined had significant large effects on stress ($g=1.16$), and moderate effects on burnout ($g=0.58$) and wellbeing ($g=0.68$). In non-randomised controlled trials, programs had significant moderate effects on stress ($g=0.62$), and small to moderate effects on anxiety ($g=0.42$), depression ($g=0.36$), and wellbeing ($g=0.44$). Studies were heterogeneous in design and methodological quality was generally poor, particularly in non-randomised controlled trials. There was an inadequate number of comparisons to perform sub-group analyses, meta-regression, or publication bias analyses. Most of the programs examined required significant time, effort, and resources to deliver and complete. These programs may not translate well outside of research trials to real-world contexts due to teachers being time poor. Priorities for research include using methodologically rigorous designs, developing programs for teachers with teachers (i.e., co-design), and considering implementation factors to ensure feasibility, acceptability, and uptake. Systematic Review Registration Number: PROSPERO - CRD42020159805.

Introduction

School teachers are a vulnerable workforce. International research shows that teachers consistently report burnout, psychological distress, anxiety, depression, fatigue, reduced self-confidence, and damaged personal relationships (García-Carmona et al., 2019; Thomson, 2020). The psychological toll on teachers has likely been exacerbated by the COVID-19 pandemic due to uncertainty around government regulations and school responsibilities, changes in ways of working, fears of exposure to COVID-19, and increased workloads (Beames et al., 2021; Ozamiz-Etxebarria, Idoiaga Mondragon, et al., 2021; Silva, Cobucci, et al., 2021; Steiner & Woo, 2021; Vargas Rubilar & Oros, 2021). Indeed, teachers have had to rapidly adapt to provide online classes and support for students when working from home during school shutdowns. Poor mental health, burnout, and low wellbeing have negative consequences for teacher performance and workforce retention, as well as for student learning and achievement (Alliance for Excellent Education, 2014; Gu & Day, 2013; Howard & Johnson, 2004; Jennings & Greenberg, 2009; Miller et al., 2008; Ronfeldt et al., 2013; Sorensen & Ladd, 2020). Finding ways to improve the psychological wellbeing of teachers is crucial to sustain and optimise the workforce, especially in response to large-scale adverse events that affect the school environment (e.g., pandemics, bushfires, school shootings).

There are a variety of programs that have been implemented to address teacher mental health, burnout, and wellbeing. Program types that have typically been delivered to teachers have included psychological approaches, such as psychoeducation, mindfulness, cognitive-behavioural skills, acceptance-based skills, behavioural stress management skills (e.g., relaxation), classroom management skills, and other socio-emotional/interpersonal skills. Two systematic reviews of randomised controlled trials (RCTs) and non-randomised controlled trials (nRCTs) examined a range of programs and psychological outcomes for school teachers at various education levels (e.g., elementary, middle, and secondary schools). The first review ($k=24$) found that mindfulness, behavioural, and cognitive-behavioural programs were effective in reducing stress and burnout (von der Embse et al., 2019). The second review ($k=29$) found that wellbeing programs were generally effective for teachers, especially positive psychology interventions and brief activities to provoke changes in thinking and feeling (Dreer & Gouasé, 2021). Meta-analytic reviews have also provided promising results for mindfulness-based programs (Klingbeil & Renshaw, 2018; Zarate et al., 2019) and burnout (e.g., burnout; Iancu et al., 2018; Oliveira et al., 2021). The consensus in the literature is that programs for teacher mental health, burnout, and wellbeing can be effective, but there is wide variety in the intervention approaches used and level of methodological rigor adopted to evaluate them.

The available reviews, although promising, are limited in some respects. Past reviews have included programs designed to build classroom competencies or student wellbeing (e.g., behavioural classroom management, teacher consultation dyads, vocal health), with the rationale that the teachers who implement them may experience secondary mental health and wellbeing benefits (Dreer & Gouasé, 2021; von der Embse et al., 2019). Programs for building classroom competencies are conceptually different to psychological programs that directly target teachers' thoughts, feelings, and responses to stressful situations. An in-depth examination of psychological programs for teachers is needed to describe what they involve and quantify how effectively they improve mental health, burnout, and wellbeing for the teaching workforce. There is also a lack of specificity about the teaching population under investigation. Past reviews generally used a broad definition of educators and school personnel, including teachers, counsellors/psychologists, principals, paraprofessionals, administration staff, pastoral carers and/or parents, and did not differentiate program effects between these groups (e.g., Iancu et al., 2018; Klingbeil & Renshaw, 2018; von der Embse et al., 2019). Focusing specifically on classroom teachers (i.e., those that have a primary responsibility for teaching) is important because they face role-specific challenges that influence appropriateness, uptake, and effectiveness of the programs designed specifically for their use.

There is a clear need for a comprehensive, methodologically rigorous approach to describe the whole suite of psychological programs empirically tested for teachers and answer questions about which are the most effective. The current systematic review and meta-analyses of psychological programs targeting mental health issues (i.e., anxiety, depression, stress, psychological distress, trauma, somatisation, sleep problems), burnout, and wellbeing in school classroom teachers directly addresses this gap.

Aims

The aim of the current review was to identify, describe, and evaluate controlled trials (both randomised and non-randomised) of psychological programs targeting the mental health, professional burnout, or wellbeing of school teachers. Including nRCTs is a strength of our approach. Given that a large proportion of studies in this field are non-randomised, their inclusion offers a wealth of information about available programs and their effectiveness in real-world contexts. Our approach extends the existing reviews in the field by evaluating a comprehensive range of programs and outcomes, as well as study designs, and focusing on programs for the teaching workforce. We also evaluate methodological rigor by using established tools to evaluate study quality and risk of bias of the included studies.

Methods

Protocol and Registration

Consistent with Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Moher et al., 2009), this review was prospectively registered with PROSPERO on 27th November 2019 (CRD42020159805).

Systematic Review Eligibility Criteria

Types of participants. Participants were teachers, from pre-service (i.e., teaching candidates pursuing formal qualifications/licences) to experienced levels, who had a primary responsibility for educating students (i.e., classroom teachers, special education teachers). Examples include early childhood teachers (e.g., pre-school), elementary/primary school teachers (Kindergarten/Preparatory to Grade 6), middle school teachers (e.g., Grades 6 to 8), and secondary/high school teachers (i.e., Grades 7 to 12). The terms early childhood, elementary, middle, and secondary school will be used throughout this review to ensure consistency in terminology. Tertiary education or vocational teachers were not included. Studies that combined an eligible teacher sample with another sample (e.g., students, parents) were included in the review if teachers comprised >50% of the sample.

Types of programs. Eligible programs included any psychological program delivered to the identified population that aimed to impact their mental health, professional burnout, and/or wellbeing outcomes. These programs were defined as targeting thoughts, feelings, and/or responses to stressful situations. Examples include Cognitive-Behavioural Therapy, Mindfulness-Based Stress Reduction, and emotional-skills training. Programs that were not delivered to teachers or did not directly aim to impact their mental health, burnout, or wellbeing outcomes were excluded. To be included in the review, the psychological component/s of multi-component programs had to comprise >75% of the program.

Types of control group. Studies were included in the review if they included any type of control (e.g., no-intervention or treatment as usual, waitlist control, attention control) or comparison group.

Types of outcomes. Studies were included if they reported outcomes for teachers that had a clear mental health, professional burnout, and/or wellbeing component. Mental health symptoms or diagnoses included anxiety, depression, stress, psychological distress, post-traumatic stress-disorder, secondary traumatic stress or vicarious trauma, somatisation, and sleep problems. Wellbeing outcomes included subjective wellbeing and quality of life, where subjective wellbeing refers to cognitive and/or additive appraisal of one's life (e.g., life satisfaction or work satisfaction). Secondary outcomes, including resilience, positive and negative affect, and fatigue, were included from studies that met all other inclusion criteria. All outcome measures needed to be valid and use reliable rating scales suitable for adults or teaching professionals.

Types of studies. Quantitative studies were included if they included any type of control or comparison group, namely RCTs, including cluster RCTs, and nRCTs. Studies were included if they were published in the English language in peer-reviewed journals. Studies without a control or comparison group, studies that were purely descriptive or qualitative, and protocol papers were excluded.

Search Strategy

Consistent with the PRISMA statement, we conducted a systematic search of three electronic databases: PsychINFO, MEDLINE, and EMBASE. We used a combination of keywords and Medical Subject Heading (MeSH) terms related to (a) teachers, (b) mental health, professional burnout, and wellbeing outcomes, and (c) interventions/programs. The search was conducted on 11th of February 2020. See Appendix A for search strategy used for PsychINFO. The search was adapted to meet the requirements of each database. No limits were applied to the search. This search was re-run on the 13th November 2020 and again on the 30th November 2021 to identify recently published articles.

Data Extraction and Management

Study characteristics and outcomes were extracted by JRB, SS, and AR and entered into a Microsoft Excel spreadsheet. A smaller subset of extracted data (10%) was checked independently by AW-S. There were no discrepancies. We extracted the following data when reported: author, year of publication, country of study, allocation level, control/comparison group, reimbursement, teacher type, universal (delivered to all teachers regardless of initial symptom levels) or indicated (delivered to teachers with elevated mental health symptom levels) sample, sample size, percent attrition from the program, mean age, percent female, program name and details (i.e., content, delivery method and setting, length, number of sessions, format, facilitator, home tasks, and program specificity to teachers), and outcomes. Program content was categorised based on the primary theoretical approach (e.g., mindfulness and/or relaxation, cognitive-behavioural skills, socio-emotional, relationship and/or interpersonal skills). Program specificity to teachers refers to whether the program was developed/adapted specifically for teachers or the school context or whether it was developed for another group/purpose and applied to teachers without adaptation. We also extracted length of follow-up for both the program and control groups when available. We extracted data for post-intervention (< 1 month), short-term (1–6 months inclusive), and/or long-term >6 months follow-up. These categories were based on the time-periods most frequently reported by authors. Few studies reported intervention adherence or fidelity, school type and location, and so they are not considered further.

Quality and Risk of Bias

We used the Cochrane Collaboration Risk of Bias tool for RCTs (ROB-II, Sterne et al., 2019) and for non-randomised intervention studies (ROBINS-II, Sterne et al., 2016) to assess the quality and risk of bias of studies included in the review. We selected domains based on relevance to psychology intervention trials.

ROB-II. We assessed studies in relation to: (1) allocation sequence and concealment, (2) deviations of intended intervention assignment, (3) missing outcome data, (4) measurement of the outcome, and (5) selective reporting of data. All papers were independently coded by two authors (JRB, SS, LM, BO, SL, and/or

AR), and the team resolved disagreements through discussion.

ROBINS-I. We assessed studies in relation to: a) bias due to confounding, b) bias in selection of participants into the study, c) bias due to deviations from intended interventions, d) bias due to missing data, e) bias in measurement of outcomes, and f) bias in selection of the reported result. Ratings were made independently by JRB and LM, and the authors resolved disagreements through discussion and consultation with AW-S.

Meta-analytic Procedures And Analyses

Inclusion Criteria

The meta-analyses involved more stringent criteria to enable stronger quantitative conclusions about efficacy of programs for teachers. For studies that combined an eligible teacher sample with another ineligible sample, they were only included in the meta-analyses if separate data was available for the eligible teaching subsample. Studies that used a comparison rather than a control group were included in the review for completeness, but not the meta-analyses.

Data Extraction

For studies meeting inclusion criteria, we extracted means, standard deviations, and sample size of completers at post-intervention, and short- and long-term follow-up. When means and standard deviations were not available, we extracted mean difference scores. In studies in which appropriate outcome data were not reported, JRB contacted the authors to obtain this information.

For studies that included data from total scale scores and component subscales, we only included relevant subscales (e.g., the Anxiety, Depression, and Somatisation Subscales of the Brief Stress Inventory were included, but not the Global Symptom Severity Index). For studies that included two measures of the same outcome domain (e.g., the Perceived Stress Scale and the Depression, Anxiety and Stress Scale – Stress Subscale), we included the most used measure across studies. For the Maslach Burnout Inventory, we used the emotional exhaustion subscale. For studies that included multiple wellbeing measures, we selected those that assessed general wellbeing over those that assessed satisfaction, and given the focus of our review on workplace, we selected work satisfaction measures over life satisfaction measures.

Calculation of Effect Sizes

We used Comprehensive Meta-Analysis (version 3.0, Biostat Inc.) to calculate individual study and pooled effect sizes. For each comparison between an intervention and control group, we calculated the standardised mean difference at post-intervention adjusted for small samples (Hedges' g ; Hedges & Olkin, 2014). This calculation involves subtracting the average score of the intervention group at post-intervention from the average score for the control group at post-intervention and dividing the result by the pooled standard deviation of the two groups (i.e., controlled effects). Effect sizes of 0.2, 0.5 and 0.8 refer to small, moderate, and large effect sizes, respectively (Cohen, 2013). We also calculated the 95% confidence interval around effect sizes. For studies that had multiple control groups, we divided the number of participants in the intervention group by the number of control groups such that each participant was only represented once in the meta-analyses. We used a random effects model because considerable heterogeneity among studies was expected. This model assumes that the true effect size varies from one study to the next, and therefore permits the generalisation of the corrected effect size estimate to the broader population (Borenstein, 2009).

We conducted meta-analyses separately for RCTs and nRCTs. For both types of trials, we calculated controlled post-intervention effect sizes for (i) depression, (ii) anxiety, (iii) stress, (iv) burnout, and (v) wellbeing. We also calculated controlled post-intervention effect sizes for somatisation in RCTs and for psychological distress in nRCTs. Short-term follow-up controlled effects were only calculated for nRCTs (anxiety, depression, stress, burnout, wellbeing). There were not enough studies to calculate effect sizes for the other primary and secondary outcome variables at each measurement point. The significance level for these analyses was set at $p < .008$ (.05/6) following a Bonferroni correction.

Heterogeneity

We calculated the I^2 statistic to test the heterogeneity of effect sizes at post-intervention. I^2 values are commonly expressed as percentages, whereby 25%, 50%, and 75% correspond to low, medium, and high levels of heterogeneity, respectively (Higgins & Thompson, 2002). The 95% confidence interval limits were also calculated to estimate dispersion in the observed effect sizes.

Additional Analyses

Additional analyses were planned, however, there was an inadequate number of comparisons to perform sub-group analyses, meta-regression, or publication bias analyses for each of the primary outcomes. Guidelines suggest that at least 10 studies are needed in a meta-analysis to adequately power tests of moderation and funnel plot asymmetry (Higgins, updated February 2021; Tanner-Smith & Grant, 2018).

Descriptive Results

Selection of Studies

See Figure 1 for the PRISMA diagram illustrating the study selection process. A total of 19,592 articles were identified, from which 3816 duplicates were removed. Titles and abstracts of 15,776 articles were screened for eligibility. JRB screened articles from the original search. JB, SS, and AR screened articles from the updated searches. 15,573 articles were deemed irrelevant and therefore excluded. JRB, SS, and AR then independently screened the full text articles

of the remaining 203 records. Of these records, 120 were excluded because they did not meet the inclusion criteria. Any disagreements were resolved through discussion and consultation with AW-S. Screening resulted in 83 articles (46 RCTs, 37 nRCTs) being included in the current review. One article (Jennings et al., 2019) reported follow-up data of an RCT reported separately (Jennings et al., 2017), leaving 82 original studies included in the review. Of these articles, 39 were included in the meta-analyses (19 RCTs, 20 nRCTs).

<INSERT FIGURE 1>

Study Characteristics

See Tables 1 and 2 for characteristics of included RCTs and nRCTs, respectively. The 82 unique studies included in the current review had a total of 8325 participants. Sample sizes were generally small, with a median of 62.5 participants (range: 14 to 961). For primary mental health outcomes, 30 (36.69%) studies examined anxiety, 23 (28.05%) examined depression, 47 (57.32%) examined stress, four (4.88%) examined psychological distress, one (1.22%) examined trauma, seven (8.54%) examined sleep, three (3.66%) examined somatisation, 37 (45.12%) examined burnout, and 24 (29.27%) examined wellbeing including work/life satisfaction. For secondary outcomes, five (6.1%) studies examined resilience, 16 (19.51%) examined positive/negative affect, and three (3.66%) examined fatigue.

Control Group

Most studies included a control group ($n=71$, 86.59%), with 11 evaluating the intervention against a comparison group such as another individual psychological intervention or a classroom-management style intervention (13.41%). Most studies used a passive control group ($n=62$, 85.92%), including a waitlist control ($n=34$, 53.97%) or a no-intervention control ($n=29$, 46.03%). No-intervention control groups were those that did not receive the formalised intervention at any point during the study. Three studies (4.23%) used an active control, and one study (1.41%) used a combination of passive and active control groups. Five (7.04%) studies did not specify the type of control group.

Population Characteristics

Most studies were conducted in the United States of America or Canada ($n=26$, 31.71%), followed by Europe ($n=19$, 23.17%) and Asia ($n=19$, 23.17%). Most studies exclusively recruited school teachers that had a primary teaching role ($n=61$, 74.39%), although 19 (23.17%) studies included other school professionals (e.g., counsellors, principals, administration staff, assistants) and 2 studies (2.44%) did not specify the type of teaching sample. There were a variety of teaching levels investigated. Just under one third ($n=24$, 29.27%) of the studies included a combination of teaching levels (e.g., pre-school, elementary, and secondary), while 19 (23.17%) focused on secondary levels, 14 (17.07%) focused on elementary levels, and two (2.44%) focused on middle school levels. Fewer studies focused on pre-service ($n=8$, 9.76%), special education ($n=6$, 7.32%), and early childhood ($n=2$, 2.44%), and seven (8.54%) studies did not provide any information about teaching level. Most studies delivered programs universally ($n=71$, 86.59%); 11 (13.41%) studies delivered programs to indicated samples. The samples were predominantly female (78.66%, range=32.26%-100%), with a mean age of 39.75 years. See Tables 1 and 2 for additional details about the population.

Randomisation

The largest proportion of studies randomised teachers at the individual level ($n=60$, 73.17%), followed by randomisation at the school level ($n=15$ studies, 18.29%). Four studies randomised at the classroom level (4.88%), two randomised at the university/college level (i.e., for pre-service school teachers; 2.44%), and one study did not report level of randomisation (1.22%).

Program Characteristics

Program content. Most studies examined a mindfulness and or/relaxation-based program ($n=31$, 37.8%), followed by cognitive-behavioural skills ($n=13$, 15.85%), stress management skills ($n=13$, 15.85%), and then socio-emotional, relationship and/or interpersonal skills ($n=8$, 9.76%). Fewer studies included rational emotive behaviour therapy programs ($n=5$, 6.1%) or acceptance and commitment therapy programs ($n=2$, 2.44%). A group of studies ($n=10$, 12.2%) used strategies that did not fall into these categories. This group of studies combined many different theoretical approaches to psychological therapy (e.g., acceptance and commitment, cognitive-behavioural, visualisation, and relaxation skills), or focused on gratitude skills, work environment strategies, sleep education, or transpersonal psychology. Most programs were context-specific, meaning that they were developed/adapted for teachers ($n=62$, 75.61%). These programs typically included strategies that addressed stressors and experiences characteristic of the teaching role and workplace environment, as well as strategies that addressed teacher mental health issues. Other programs were context-general, applied to teachers without any adaptation to their role or workplace ($n=18$, 2.44%). Two (2.44%) studies did not provide enough information to categorise. The majority ($n=70$, 85.37%) of the studies reported on home task requirements of the programs. Home tasks were varied in terms of length and duration, ranging from 30-40 minutes of formal mindfulness practice each day for 5-weeks (Vesely et al., 2014) to conducting progressive muscle relaxation each day for 8 minutes throughout the program (Shimazu et al., 2003).

Format and delivery. Most programs were conducted face-to-face ($n=73$, 90.12%), were delivered exclusively in group format ($n=64$, 80%), and were either school-based ($n=28$, 34.16%) or school-supported ($n=17$, 20.73%). School-based refers to a program that is endorsed by the school and delivered to teachers during school hours, or before/after school, on school premises. School-supported refers to a program that is endorsed by the school, but does not require additional school resourcing (e.g., time/funding). Most programs were delivered over 1-12 weeks ($n=56$, 68.29%), comprised 1-8 sessions ($n=51$, 62.2%) with each session lasting between 1-4 hours ($n=48$, 58.54%). Over half of studies identified the intervention facilitator ($n=60$, 73.17%). Of these studies, 53 (88.33%) used a facilitator that was external to schools, including accredited or certified trainers (e.g., qualified mindfulness practitioner teachers), clinical psychologists, and researchers. Only 3 (5%) studies reported using a facilitator that was internal to the school context, such as a teacher or nurse. Four

(6.67%) studies did not require a facilitator because the programs were self-guided or delivered online. See Tables 1 and 2 for additional details about format and delivery.

Reimbursement

Most studies ($n=64$, 78.05%) reported whether teachers received reimbursement for their participation, of which 47 (57.32%) did not provide any reimbursement. For the studies that did report providing reimbursement ($n=17$, 20.73%), there was considerable variation ranging from professional development points or course credits, reduced pricing for the program, money, and a chance to earn gift certificates.

Outcomes

A wide range of measures was used to assess primary outcomes, with a total number of 65 across the studies included in the review (not including individual subscales). See Tables 1 and 2. Stress and burnout were the most consistently measured outcomes, with 23 (48.94%) studies using the Perceived Stress Scale and 29 (78.38%) studies using the Maslach Burnout Inventory. The State Trait Anxiety Inventory – State Subscale ($n=10$, 33.33%) was the most used measure for anxiety, and the Depression, Anxiety, Stress Scales – Depression Subscale ($n=8$, 34.78%) was the most used measure for depression. There was no clear consistency in the measures used to assess psychological distress, somatisation, sleep problems, or wellbeing.

Length of Follow-Up

For the first measurement point, 70 (85.37%) studies measured outcomes within one-month of finishing the intervention, 9 (10.98%) studies measured outcomes 1-6 months after post-test, and two (2.44%) studies measured outcomes more than 6 months after post-test. Only 26 (31.71%) studies reported relevant follow-up measures for both the control and program groups. Of these studies, 24 (92.31%) were assessed 1-6 months after post-test and 2 (7.69%) were assessed more than 6 months after post-test. One study included a follow-up measure but did not specify when the measurement took place.

Attrition

Over half of the studies ($n=54$, 65.85%) reported percentage attrition from the program. Average attrition from the program group was 13.5%, ranging from 0% to 66.67%.

<INSERT TABLE 1 >
<INSERT TABLE 2>

Risk of Bias

ROB-II. As seen in Table 3, half ($n=23$) of the RCTs were assessed to have some concerns and the other half ($n=23$) were assessed to have high risk of bias. Most studies were assessed to have some concerns due to participants being aware of the assigned intervention ($n=44$; 95.65%) or due to an absence of a pre-specified analysis plan ($n=42$; 91.3%). High risk of bias was most typical in the missing outcome domain, with 60.87% ($n=28$) of the studies not reporting enough information about dropout or (Higgins, updated February 2021) not accounting for dropout. Approximately 69.87% of studies ($n=32$) did not report enough information to ascertain whether intervention allocations could have been foreseen prior to or during enrolment.

<INSERT TABLE 3>

ROBINS-I. As seen in Table 4, 34 (83.78%) of the nRCTs were assessed to have serious risk of bias and the remaining 3 (8.12%) were assessed to have critical risk of bias. This result was primarily due to the outcome domain. All but one of the studies ($n=36$, 89.19%) were assessed to have serious risk of bias because the measurement tools were self-report and the participants were likely aware of the intervention received. In addition, 18 studies (48.64%) had serious or critical risk of bias in the reporting domain because they lacked a clear analysis plan, and 19 studies (51.35%) had serious or critical risk of bias in the confounding domain because they lacked experimental and statistical control of extraneous variables. Nine (24.32%) of studies did not report enough information about missing data to make a judgment about risk.

<INSERT TABLE 4>

Meta-analytic Results

Meta-analyses using random effects models were conducted for RCTs and nRCTs separately to compare the intervention and control groups on the outcomes at post-intervention and follow-up (i.e., controlled effects). Outcomes with enough studies to be meta-analysed included anxiety, depression, stress, psychological distress, somatisation, burnout, and wellbeing. The significance threshold was set at $p < .008$. See Figures 3-14 in Appendix B for forest plots.

Randomised Controlled Trials

Controlled effects at post-intervention were significant and of a large size for stress ($g=1.16$, $k=8$, $CI_{95\%}=0.43-1.88$, $p=.002$), and of a moderate size for burnout ($g=0.58$, $k=9$, $CI_{95\%}=0.26-0.90$, $p < .001$)[1] and wellbeing ($g=0.68$, $k=4$, $CI_{95\%}=0.27-1.09$, $p=.001$). Post-intervention effects were not significant at the conservative threshold for anxiety ($g=0.51$, $k=2$, $CI_{95\%}=0.06-0.96$, $p=.03$), depression ($g=0.25$, $k=3$, $CI_{95\%}=0.00-0.50$, $p=.05$), and psychological distress ($g=3.84$, $k=2$, $CI_{95\%}=-2.19-9.86$, $p=.21$). The short-term follow-up intervention effect sizes were large and significant for stress ($g=1.84$, $k=5$, $CI_{95\%}=0.61-3.07$, $p=.003$), but non-significant for anxiety ($g=2.64$, $k=2$, $CI_{95\%}=-1.82-7.10$, $p=.25$) and burnout ($g=0.84$, $k=4$, $CI_{95\%}=0.17-0.15$, $p=.02$).

Heterogeneity. Based on I^2 statistics sizes (see Table 5), there was high heterogeneity in the controlled effects at post-intervention for stress, psychological distress, and burnout. There was low to medium heterogeneity for depression, anxiety, and wellbeing. The heterogeneity estimates for stress and burnout were estimated with some precision, whereas the other estimates were not. This imprecision likely reflects small sample sizes (von Hippel, 2015).

<INSERT TABLE 5>

Non-Randomised Controlled Trials

Controlled effects at post-intervention were significant and of a small to moderate size for anxiety ($g=0.42$, $k=9$, $CI_{95}=0.17-0.67$, $p=.001$), depression ($g=0.36$, $k=6$, $CI_{95}=0.09-0.62$, $p=.008$), stress ($g=0.62$, $k=9$, $CI_{95}=0.39-0.86$, $p<.001$), and wellbeing ($g=0.44$, $k=7$, $CI_{95}=0.24-0.65$, $p<.001$). Effects were non-significant for somatisation ($g=0.75$, $k=2$, $CI_{95}=-0.61-2.11$, $p=.28$) and burnout ($g=0.28$, $k=4$, $CI_{95}=-0.02-0.58$, $p=.07$). Controlled effects at short-term follow-up were non-significant for anxiety ($g=0.33$, $k=3$, $CI_{95}=0.08-0.59$, $p=.011$), depression ($g=0.09$, $k=2$, $CI_{95}=-0.20-0.38$, $p=.53$), stress ($g=1.13$, $k=3$, $CI_{95}=-0.28-2.54$, $p=.12$), burnout ($g=0.14$, $k=2$, $CI_{95}=-0.28-0.57$, $p=.51$), and wellbeing ($g=0.15$, $k=3$, $CI_{95}=-0.09-0.39$, $p=.23$).

Heterogeneity. Based on I^2 statistics (see Table 6), there was moderate to high heterogeneity in the controlled effects at post-intervention for depression, anxiety, stress, wellbeing, and somatisation. The wide confidence intervals indicate that these estimates are imprecise. The heterogeneity estimates for burnout and somatisation may not be reliable given the few comparisons contributing to the effect size (von Hippel, 2015).

<INSERT TABLE 6>

[1] Based on a series of sensitivity analyses, one study (Ugwoke et al. 2018) was treated as an outlier and removed for burnout. Removing this study almost halved the estimated mean effect size (i.e., from $g=1.05$ to $g=0.58$).

Discussion

We systematically reviewed the existing literature on psychological programs for the mental health, burnout, and wellbeing of school classroom teachers. We identified 82 unique studies with a total of 8325 participants for the review (including 45 RCTs and 37 nRCTs). Consistent with existing literature, there was wide variability in the programs in terms of theoretical approach, structure, and format. We also calculated overall program effects on anxiety, depression, stress, psychological distress, somatisation, burnout, and wellbeing. We found that the psychological programs evaluated by these studies have positive effects for a range of mental health outcomes, as well as burnout and wellbeing, relative to control groups.

The meta-analyses showed that teacher programs are superior to control groups on most outcomes at the immediate post-test, with some effects sustained over the short-term (1-6 months). The size of the immediate effects varied. In RCTs, evaluated programs had significant large effects on stress ($g=1.16$), and moderate effects on burnout ($g=0.58$) and wellbeing ($g=0.68$) compared to controls. In nRCTs, programs had significant moderate effects on stress ($g=0.62$), and small to moderate effects on anxiety ($g=0.42$), depression ($g=0.36$), and wellbeing ($g=0.44$) compared to controls. The effect sizes for stress increased in size for both types of trials over the short-term compared to controls ($gs=1.13-1.84$), although the effect was only significant for RCTs. Few studies evaluated sustained effects over time. Follow-up measurements are necessary to evaluate whether effects persist or deteriorate over time. Overall, these findings are generally consistent with other meta-analyses that investigated the controlled effects of different programs on teacher mental health, burnout, or wellbeing outcomes (Iancu et al., 2018; Klingbeil & Renshaw, 2018; Oliveira et al., 2021; Zarate et al., 2019).

Despite the promising findings from our meta-analyses, there was considerable heterogeneity in the included studies. Confidence intervals either could not be estimated due to small samples or indicated that heterogeneity estimates were imprecise. The exception to this pattern was burnout and stress outcomes in RCTs, for which heterogeneity was high and estimated with precision. In this case, high heterogeneity most likely captures the cross-disciplinary and emerging nature of the field. The implication is that researchers are using different programs, research designs, methods, and analysis techniques to explore effects on teacher outcomes. Support for this explanation comes from our review findings. Of note, there was a lack of consistency in how mental health, burnout, and wellbeing outcomes were measured, and the types of programs being evaluated. Programs were eclectic in terms of duration and frequency of sessions (i.e., intensity), delivery setting and level of school involvement, learned strategies, and the theory underpinning the treatment model (e.g., cognitive-behavioural principles, mindfulness principles, demands-resources model of coping, transpersonal theory etc). This finding converges with other descriptive systematic reviews and meta-analyses investigating teacher mental health programs (e.g., Dreer & Gouasé, 2021; Klingbeil & Renshaw, 2018; von der Embse et al., 2019).

Across the breadth and variety of psychological programs included in this review, one consistent similarity emerged. Most programs required significant time, effort, and resources for the teachers to complete. For example, programs were typically delivered face-to-face, in groups in dedicated spaces, and required trained or accredited facilitators who were external to the school. Sessions were also demanding. Most programs included 1-8 sessions that lasted between 1-4 hours each, delivered over 1-12 weeks, in teachers' own time. These programs typically followed structured or manualised psychological intervention protocols. For example, mindfulness and/or relaxation-based programs were the most common (37.8%) followed by cognitive-behavioural skills (15.85%) and stress management skills (15.85%). These programs require a significant time commitment for a workforce that is renowned for being time-poor and struggling to cope with ever-changing job demands (Thomson, 2020). Time is often identified by teachers as a major barrier to engaging in and completing programs (Fang et al., 2021). Study attrition rates support this as a barrier. Our review showed that attrition rates reached as high as 66.67% in the program groups, with an overall mean of 13.5%. It may be the case the attrition was higher in more demanding programs. We were unable to formally test this hypothesis due to small sample sizes in our meta-analyses, and review findings may be skewed because over 30% of studies did not report attrition.

Programs do not have to be time- or resource-intensive to be effective. For example, providing programs online is one way to reduce demands. This delivery method can be fully automatic, meaning that highly trained experts are not needed to facilitate sessions, and can be asynchronous, meaning that teachers

can complete modules in their own time. For example, one study evaluated an online stress management skills program in pre-service, elementary, and secondary school teachers (Ansley et al., 2021). The program was self-paced and consisted of eight 30-minute modules, with the recommendation of completing two modules per week for four weeks. Most teachers (92.8%) completed the program, defined by the study authors as completing 75% of the modules. The program (versus control) was associated with decreased emotional exhaustion, a core feature of burnout. Another study evaluated internet-based problem-solving training, consisting of one self-guided lesson per week for five weeks, in a teaching sample with elevated depression levels (Ebert et al., 2014). The training (versus control) reduced depressive symptoms, as well as stress and worry, at post-test, three-month follow-up, and six-month follow-up. Over half (60%) of teachers completed the program. These completion rates are reasonable given the low intensity of the programs and compare well to rates in other studies evaluating internet-based stress management programs in employee samples (Zarski et al., 2016). Asynchronous online programs may overcome logistical issues in implementation (e.g., organising times, dates, and locations for sessions), prevent premature discontinuation, and be more feasible to roll-out at scale.

Most of the studies included in the review did not measure program fidelity and program adherence. Fidelity refers to the extent to which a program is delivered as intended (Carroll et al., 2007; Schoenwald et al., 2011) and adherence refers to the extent to which participants completed the program requirements (e.g., all sessions/modules). Fidelity and adherence are important in the translation of research to practice when implementing programs in the real-world. They are key indicators of whether a program is appropriate/acceptable for the intended audience and context, whether there are enough resources to support delivery, and whether it is being used (Carroll et al., 2007). This information is essential to guide effective decisions about which programs to implement, to whom, and when (Peters et al., 2013). Similar to other work in this field (Werner-Seidler et al., 2017), our position is that taking steps to ensure program fidelity and adherence must be a priority in future research. Exploring the extent to which adherence influences outcomes has not yet been investigated in teacher mental health research.

Methodological Quality

The quality of studies across both RCTs and nRCTs was problematic. Awareness of the assigned intervention, use of self-report measures, absence of a pre-specific analysis plan, and lack of information about missing data and drop out were assessed to be key contributors to bias. Masking intervention assignment in psychological research is difficult because of the inherent nature of psychological interventions; they generally involve a psychoeducational component and require participants to actively learn and engage in new skills. Similarly, using self-report measures in psychological research is the standard approach to assess subjective internal states. Given their ubiquity in the field, awareness and response biases may be less problematic than others identified in our review. Ensuring that methods are transparent and replicable (e.g., by registering protocol and data analysis plans using open science principles) and accurately represent the data (e.g., by using intention to treat analyses and accounting for missing data) will go part way to address bias in analyses and reporting.

Almost half (44.58%) of the studies in the review were nRCTs. Whilst these trials do provide useful information about effectiveness, it is conceptually difficult to reach a level of quality that is comparable to an RCT. We classified all nRCTs as having either serious or critical risk of bias. nRCTs are often an initial step in the research process to gauge uptake and response to programs because they are easier to implement than RCTs in real-world contexts. Randomising working teachers, or schools, to different interventions can be difficult, particularly when they are interested in receiving a potentially helpful program. However, our meta-analyses showed that effect sizes were generally larger in RCTs than in nRCTs. RCTs will be an important way forward as the field matures.

Limitations

The results of this systematic review and meta-analyses need to be interpreted in the context of some limitations. Due to practical reasons, we only included peer-reviewed studies that were published in English and we did not include grey literature or unpublished studies. Another limitation was the small number of studies included in the meta-analyses. There were not enough effect sizes to do more comprehensive meta-analyses, explore moderators, or evaluate publication bias. Further, our analyses were likely underpowered to detect small-to-moderate between-group effect sizes for some outcome measures with small sample sizes. Updated meta-analyses are needed once more studies become available in the mental health, burnout, and wellbeing domains.

Future Research

Our systematic review and meta-analyses identified several areas for future research. Increased consistency in measurement is needed to clarify how programs affect specific mental health, burnout, and wellbeing outcomes in the teaching workforce and enable comparison across studies. Increased focus is also needed on less studied, but equally important, outcomes such as trauma, sleep, and resilience. Future research should take a systematic approach to measurement, not only using standardised measures with sound psychometric properties, but also those that are validated with teachers and the school context. More comprehensive evaluation of follow-up periods to gauge the trajectory of effects over time once a program has finished is also necessary to further quantify effectiveness. Overall, there is a clear need for rigorous methodology in study design to reduce risk of bias and increase validity and reliability of findings.

Translation from research trials to the real-world is a critical factor to consider when designing and rolling-out programs. Even though the programs identified in our review and meta-analyses are generally effective, their translational potential is unclear. This is particularly the case given how demanding and resource heavy the available programs currently are. Such characteristics are problematic given the high program attrition identified in our review. Insights from co-design research have potential to transform the nature of programs being developed and the studies being designed to evaluate them. Co-design involves relevant stakeholders in the conceptualisation and/or development of programs (Sanders & Stappers, 2008). Most programs identified in our review were developed or adapted for teachers (75.61%). Although we did not specifically extract and analyse data on co-design, we did not identify any papers that reported co-design principles. Involving teachers, as well as school leadership and representatives from relevant governing bodies, is important to understand

what they want and how a program would fit within the school context. This process would likely increase the feasibility of implementation, perceived acceptability from those intended to use and benefit from the program and, in turn, the uptake and effectiveness of the program (Steen et al., 2011).

Conclusions

Our systematic review and meta-analyses identified, described, and evaluated psychological programs targeting the mental health, burnout, or wellbeing of school teachers. We found that the programs currently available can reduce stress, depression, anxiety, and burnout, and increase wellbeing relative to controls. However, there is a need for future studies to prioritise methodological rigor to produce valid results that can be replicated. Most programs currently available require significant time, effort, and resources to deliver and complete. Teachers are time poor, and these programs may not translate well outside of research trials to real-world contexts. Incorporating principles from co-design and implementation research, as well as considering novel ways of delivering programs that reduce demands on teachers (e.g., online programs delivered asynchronously) are necessary to develop programs that work, but that are also used as intended. Against the backdrop of worsening outcomes for teachers due to everchanging roles and responsibilities, as well as unpredictable community events (e.g., COVID-19, other natural disasters), now is the time to develop and evaluate programs that address teacher mental health, burnout, and wellbeing.

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None to declare.

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JRB, AW-S, and BO contributed to the study conception and design. JRB, SS, and AR conducted screening and data extraction. JRB summarised the descriptive data for the review and conducted the meta-analyses. JN provided guidance on the quantitative data analyses. JRB, SS, AR, LM, SL, and BO conducted the risk of bias assessments. The first draft of the manuscript was written by JRB. All authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

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Tables

Table 1 *Characteristics of Randomised Controlled Trials in the Review*

Study	Country	Population	N	Mean Age	Attrition	Control	Program	Theoretical Approach	Program Content	Program Session
Ancona et al. 2014*	USA	Elementary & Middle teachers	47	NR	16.00	NI	Holistic Life Foundation Yoga & Mindfulness Curriculum	Mindfulness and/or relaxation	Yoga & Mindfulness practices to train awareness and attention, including breathing, visualisation, yoga postures, guided mindful reflection	3-week 45-min session
Ansley et al. 2021*	USA	Pre-service, Elementary, & Secondary	59	NR	6.90	NI	Online stress intervention	Stress management skills	Online stress program including response activation and cognitive restructuring, self-care, mindfulness, relaxation, relationships at work, routines and stress, de-escalation	4-week eight 3 sessions delivered twice per week
Au et al. 2016	Hong Kong	Elementary Secondary, & Special Education teachers	60	NR	13.33	None	Stress Management Program	Cognitive-behavioural skills	Cognitive-behavioural principles including psychoeducation, identification of work stress, cognitive restructuring	8-week eight 9 sessions delivered weekly
Benn et al. 2012 ^a	USA	Special Education teachers and parents	38	45.60	26.32	WL	SMART-in-Education Program	Stress management skills	Stress management and relaxation techniques, based on MBSR plus emotion regulation, forgiveness, kindness, and compassion	12-week eight 3 sessions
Berger et al. 2016 ^a	NZ	Secondary teachers, counsellors, administrators, psychologists	69	44.57	2.86	None	ERASE-Stress New Zealand Program	Other	Coping skills and resilience strategies to deal with traumatic stress, including psychoeducation, mindfulness, body-oriented exercises, art-therapy, narrative techniques	3 full days of workshops
Bertoch et al. 1989*	USA	Middle and Secondary teachers	30	38.10	NR	NI	Stress Management Program	Stress management skills	Psychoeducation, assertiveness training, relaxation and breathing strategies, meditation, self-care	Twelve sessions
Biglan et al. 2013 ^a	USA	Pre-school teachers, assistants, affiliated family consultants	28	NR	0.00	WL	ACT Workshops	ACT	Sleep education, including physiological & behavioural characteristics, mechanisms of regulation, sleep hygiene	8-week four 4-session delivered fortnightly
Castillo-Gualda et al. 2017 ^a	Spain	Early Childhood, Elementary & Secondary teachers, managers	54	35.98	0.00	NI	RULER Program	Socio-emotional, relationship and/or	Socio-emotional learning program focused on emotional intelligence skills	12-week eight 3 sessions

								interpersonal skills		
Cecil et al. 1990 ^b	USA	Elementary & Middle teachers	54	NR	NR	NI	Stress Inoculation Training	Cognitive-behavioural skills	Cognitive-behavioural principles, including psychoeducation, relaxation training, cognitive restructuring	6-week 90-min sessions delivered weekly
Chan 2013	Hong Kong	Teachers (type not specified)	81	33.73	2.44	None	Gratitude Intervention	Other	“Count-your-blessings” activity, involving keeping weekly logs of good things or events	8-week
Cheek et al. 2003	USA	Elementary teachers	51	NR	NR	None	Stress Inoculation training	Cognitive-behavioural skills	Cognitive-behavioural principles, including psychoeducation, relaxation training, cognitive restructuring	6-week
Cook et al. 2017*	USA	Middle & Secondary teachers	44	NR	NR	AC	ACHIEVER Resilience Curriculum	Other	Wellbeing promoting intervention based on positive psychology, cognitive-behavioural principles, and ACT	5-week five 2.1 sessions delivered weekly
Cooley et al. 1996 ^{a, b}	USA	Elementary, Secondary, & Middle Special Education teachers & related services providers	37	NR	NR	WL	Stress Management Workshops	Cognitive-behavioural skills	Cognitive-behavioural principles to develop situational, physiological, & cognitive coping skills	5-week five 2-h workshops delivered weekly
De Carvalho et al. 2021*	Portugal	Elementary teachers	228	43.67	8.95	WL	Mindfulness-based program	Mindfulness and/or relaxation	Mindfulness based program that aims to promote teachers' social-emotional competencies. Three components: mindfulness practices to reduce stress, emotional self-regulation, and caring practices	10-week ten 2.5 sessions delivered weekly
Dike et al. 2021*	Nigeria	Special Education teachers	58	31.95	0.00	WL	Y-CBT program	Cognitive-behavioural skills	CBT strategies were blended with after-session Yoga exercises. Based on ABCDE group therapeutic model	12-week twelve hour sessions delivered weekly
Ebert et al. 2014*	Germany	Teachers (type not specified)	150	47.10	18.67	WL	Internet-Based Problem-Solving Training	Cognitive-behavioural skills	Cognitive-behavioural principles, including problem-solving, behavioural activation, coping with rumination	5 weeks one session guided lesson weekly
Figl-Hertlein et al. 2014	Austria	Secondary teachers	151	NR	39.53	None	Individualised Physiotherapy Directed Occupational Health	Stress management skills	Ergonomic and stress management training, including	5-month six 30-min sessions

							Program (tailored for teachers)		psychoeducation, relaxation strategies, rest and sleep patterns, behavioural activation, body awareness	
Flook et al. 2013*	USA	Elementary teachers	18	43.06	NR	WL	Modified MBSR (adapted for teachers)	Mindfulness and/or relaxation	Psychoeducation and practices including body scan, sitting meditation, walking meditation, loving-kindness meditation, choiceless awareness, yoga	8-week eight 2 sessio day mindfu immer
Franco et al. 2010	Spain	Secondary teachers	68	40.20	NR	AC	Flow Meditation Program	Mindfulness and/or relaxation	Based on ACT, including learning and practicing flow meditation, allowing and accepting thoughts, sensations and feelings, body- scan, metaphors, mindfulness (breathing)	10-week ten 90- sessio
Grant et al. 2010*	Australia	Secondary teachers	44	43.21	NR	WL	Developmental Coaching	Cognitive- behavioural skills	Cognitive- behavioural solution-focused approach to coaching on goal attainment, stress, and workplace wellbeing and resilience	20-week ten ses deliver every 1 weeks
Harris et al. 2016 ^a	USA	Middle teachers & other support staff	64	43.00	0.00	WL	CALM program for educators	Mindfulness and/or relaxation	Yoga and mindfulness practices to promote social- emotional competences, stress management, and wellbeing	16-week sixty-fi 20-min sessio deliver days p week
Hwang et al. 2019 ^a	Australia	Elementary, Secondary, & Special Education teachers (including non-teaching roles)	185	43.02	35.29	NI	Reconnected	Mindfulness and/or relaxation	MBI, including range of experiential, physical and everyday exercises e.g., mindful yoga, walking, eating and breathing	8-week eight 9 sessio
Igbokwe et al. 2019*	Nigeria	Pre-service teachers	96	20.72	4.17	NI + Whatsapp group	REBT	REBT	Cognitive, behavioural, and emotive techniques to consciously change irrational thoughts and beliefs, including reframing, distraction, acceptance, rewards	10-week ten 80- sessio deliver twice p week
Jeffcoat et al. 2012 ^a	USA	Early Education, Elementary, & Secondary teachers, administrators,	236	NR	24.79	WL	ACT self-help book	ACT	Reading self-help book, <i>Get out of your mind and into your life</i> , plus quizzes	8-week self-gu

		counsellors, & other staff								
Jennings et al. 2011	USA	Pre-service teachers	43	32	14.29	WL	CARE	Mindfulness and/or relaxation	Mindfulness-based professional development program, including emotion skills instruction, mindful awareness, stress reduction practices, caring and listening practices	6-week four day long session over week with interphone coaching
Jennings et al. 2013*	USA	Early Education, Elementary, Middle, & Secondary teachers	53	36	7.41	WL	CARE	Mindfulness and/or relaxation	Mindfulness-based professional development program, including emotion skills instruction, mindful awareness, stress reduction practices, caring and listening practices	4-6 weeks four day long session with interphone coaching plus biweekly session month later
Jennings et al. 2017; 2019 follow up data	USA	Elementary teachers	224	NR	7.00	WL	CARE	Mindfulness and/or relaxation	Mindfulness-based professional development program, including emotion skills instruction, mindful awareness, stress reduction practices, caring and listening practices	4-month five 6-hour training days, plus interphone coaching
Kaspereen et al. 2012 ^a	USA	Secondary teachers, assistants, receptionists, coaches	54	40.65	0.00	NI	Structured Relaxation Training customised for teachers	Mindfulness and/or relaxation	Meditation, deep breathing, relaxing music	4-week four 30 min sessions
Montero-Marin et al. 2021	England	Secondary teachers	206	18.10	38.80	NI	Instructor-Led Mindfulness Program	Mindfulness-based cognitive therapy	Introductory skills-based program using mindfulness-based cognitive for improving wellbeing.	8 week eight 1 hour weekly sessions
Nwabuko et al. 2019	Nigeria	Elementary teachers	86	NR	NR	NI	REAEI	REBT	Cognitive-behavioural principles, including cognitive restructuring and relaxation, plus relaxation	16-week 32 2-hour sessions
Ogba et al. 2020*	Nigeria	Special Education teachers	87	32.17	4.60	NI	REOHC	REBT	Counselling aimed to counter irrational beliefs, with cognitive, behavioural, and emotive techniques	12-week 12 1-2 sessions deliver weekly
Onuigbo et al. 2018*	Nigeria	Elementary Special Education teachers	86	39.38	0.00	NI	REBT	REBT	Cognitive, behavioural, and emotive	12-week 24 90-minute sessions

									techniques to dispute irrational beliefs, including cognitive reframing, rational emotive imagery, relaxation, systematic desensitisation	deliver twice per week
Pozo-Rico et al. 2020	Spain	Elementary teachers	141	38.40	NR	NI	REBT	REBT	Cognitive, behavioural, and emotive techniques to dispute irrational beliefs, including cognitive reframing, rational emotive imagery, relaxation, systematic desensitisation	12-week 24 90-min sessions delivered twice per week
Rao et al. 2017*	India	Elementary teachers	60	41.50	0.00	NI	MSRT	Mindfulness and/or relaxation	Mindfulness-based, yogic relaxation technique	4-week min session each day five times per week
Roeser et al. 2013	Canada, USA	Elementary & Secondary teachers	113	46.90	10.00	WL	MT	Mindfulness and/or relaxation	Mindfulness-based, including 5 activities that increase compassion and mindfulness by directing and sustaining attention intentionally and nonjudgmentally on present-moment experiences	8-week min session delivered over 31 hours
Schloss et al. 1983	USA	Special Education teachers & associates	14	30	NR	None	Relaxation Training and Systematic Desensitisation	Stress management skills	Progressive muscle relaxation and gradual exposure to provoking events	3-month 32 sessions delivered three times per week
Schoeps et al. 2019 ^a	Spain	Early Childhood, Kindergarten, Elementary, & Secondary teachers & counsellors	340	42.64	NR	NI	Emotional Skills Training	Socio-emotional, relationship and/or interpersonal skills	Emotional abilities and skills to develop perception, expression, understanding, and management of emotions	3-month seven sessions
Sharp et al. 1985 ^{a,b}	USA	Elementary, Middle, & Secondary teachers	40	NR	NR	NI	Stress Inoculation Training adapted for Teachers	Cognitive-behavioural skills	Psychoeducation, skill acquisition including relaxation and rational restructuring, and rehearsal	4-week eight 2 sessions delivered twice per week
Sottimano et al. 2018 ^b	Italy	Pre-school teachers	318	48.30	21.59	NI	Multilevel Approach developed for pre-school teachers	Other	Three approaches including individual psychological counselling, group worksite support intervention (e.g.,	Three min counselling sessions three 1 min worksite interventions

									focusing on group dynamics, relationships with colleagues) and redefinition of work environment, space and furniture	three meetings with architects redefining work
Tsang et al. 2021*	Hong Kong	Elementary, & Secondary, Special Education teachers	186	29.55	2.15	WL	MBSR MBCT	Mindfulness and/or relaxation	Based on core elements of MBSR, MBCT and Mindfulness	8-week eight 1 hour sessions
Tunnecliffe et al. 1986 ^b	Australia	Elementary teachers	14	NR	NR	WL	Relaxation Training	Mindfulness and/or relaxation	Stress psychoeducation and relaxation training	5-week five 1.5 sessions delivered weekly
Ugwoke et al. 2018*	Nigeria	Special Education teachers	54	36.67	0.00	WL	RESM	REBT	Behavioural, cognitive, and emotive techniques, including cognitive restructuring, goal-setting, relaxation, motivational interviewing, desensitisation, and imagery	12-week 20 90-min sessions
Unterbrink et al. 2021*	Germany	Secondary teachers	337	46.95	34.50	WL	Professional Relationships Intervention	Socio-emotional, relationship and/or interpersonal skills	Stress psychoeducation, relaxation training, authenticity and role identification, relationships, and social support	10-month 10 90-min sessions
Wu et al. 2006	China	Middle teachers	961	50.50	NR	NR	Organisational and Individual Level Stress Management	Stress management skills	Organisational-level strategies to modify/diminish sources of stress at work, including redesigning tasks or flexible working, and individual stress management skills including psychoeducation, relaxation techniques, cognitive coping skills, and work/lifestyle modification skills	Lectures presented twice per month the first of the then once per month for the remainder
Zolnierczyk-Zreda 2005*	Poland	Teachers (type not specified)	59	41.80	3.33	NI	Stress Management Workshop	Stress management skills	Cognitive-behavioural methods of overcoming workload (e.g., time management and priority setting skills), enhancing mastery (e.g., developing positive meaning of work), relationships (e.g., interpersonal and communication skills)	2-days hrs per

Note. * – Studies included in the meta-analysis; ^a=includes samples other than teachers, including counsellors/psychologists, administrative staff, principals, parents, affiliated family consultants, managers, learning support etc. *N*, mean ages, and dropout reported in Table 1 for these studies only include teachers when possible; ^b=These studies included more than one intervention group. Only the relevant intervention was selected for inclusion in this review and meta-

analysis, which is reported in Table 1 (see “Program” column). The total sample sizes reported for these studies only include the relevant intervention and the control group/s. The mean ages and dropout reported in Table 1 for these studies only include the relevant groups if they were reported. NR=information not reported. **N** – Total number of participants randomly allocated to groups. **Mean Age** – Mean age of the allocated sample at baseline, unless otherwise specified. **Attrition** – Number of participants lost to drop out in the intervention group only, measured after the final follow up measurement time point. **Control group** – NI=no intervention control, None=a comparison group was used rather than a control group; WL=wait-list control, AC=active control. **Program** – ACT=Acceptance and Commitment Therapy; RULER=Recognising, Understanding, Labelling, Expressing, and Regulating Emotion; MBSR=Mindfulness Based Stress Reduction; CALM=Community Approach to Learning Mindfully; MBI=Mindfulness-Based Intervention; REBT=Rational Emotive Behaviour Therapy; CARE=Cultivating Awareness and Resilience in Education; REAEI=Rational-Emotive Adult Education Intervention Programme; REOHC=Rational Emotive Occupational Health Coaching; MSRT=Mind Sound Resonance Technique; MT=Mindfulness Training; RESM=Rational-Emotive Stress Management. **Outcome Measures** – MBI-EE=Maslach Burnout Inventory – Emotional Exhaustion Subscale; TSI=Teacher Stress Inventory; PSS=Perceived Stress Scale; PWBI-A=Personal Well Being Index – Adult; STAI-S=State-Trait Anxiety Inventory – State Subscale; CES-D=Center for Epidemiological Studies Depression Scale; PANAS-P=Positive and Negative Affect Scale – Positive; PANAS-N=Positive and Negative Affect – Negative; PCL-C=Posttraumatic Check List S, ProQOL=Professional Quality of Life Scale; CDRS=Connor-Davidson Resilience Scale; OSI=Occupational Stress Inventory; JSS=Job Satisfaction Scale; ITS=Index of Teaching Stress; TSI-EM=Teacher Stress Inventory – Emotional Manifestations; JSSS-JS=Job Stress in the School Setting – Job Satisfaction; SWLS=Satisfaction with Life Scale; SWS=Satisfaction with Work Scale; MSQ-20=Minnesota Satisfaction Questionnaire – 20 items; SF-36 MCS=Short Form 36 Health Survey – Mental Health Component Score; SF-12 MCS=Short Form 12 Health Survey – Mental Health Component Score; PSWQ=Penn State Worry Questionnaire; SC 90-R=Symptom Checklist 90-R; MBI-ES=Maslach Burnout Inventory – Educator Survey; MBI-ES-EE=Maslach Burnout Inventory – Educator Survey – Emotional Exhaustion Subscale; DASS-D=Depression Anxiety Stress Scale – Depression Subscale; DASS-A=Depression Anxiety Stress Scale – Anxiety Subscale; DASS-S=Depression Anxiety Stress Scale – Stress Subscale; WWBI=Workplace Well-Being Index; CHS=Cognitive Hardiness Scale; SRIS=Sleep-Related Impairment Scale; PSQI=Pittsburgh Sleep Quality Index; OLB-S-E=Oldenburg Burnout Inventory for Students – Exhaustion Subscale; PHQ-8=Patient Health Questionnaire 8-item Depression Scale; GAD-7=Generalised Anxiety Disorder 7-item Scale; PROMIS-SDQ=PROMIS Sleep Disorder Questionnaire; WEMWBS=The Warwick-Edinburgh Mental Well-being Scale – 14 items; TBI=Teachers’ Burnout Inventory; OSI=Occupational Stress Index; TSQ=Teacher Stress Questionnaire; GHQ-12=General Health Questionnaire; PFS=Piper Fatigue Scale; BDI=Beck Depression Inventory; SBI-PE=Spanish Burnout Inventory – Psychological Exhaustion Subscale; TOSQ=Teacher Occupational Stress Factor Questionnaire; TBS-E=Teacher Burnout Scale – Exhaustion Subscale; PED=Profile of Emotional Distress; TBS-EE=Teacher Burnout Scale – Emotional Exhaustion; OSI-R-PS=Occupational Stress Index – Revised – Personal Strain Subscale.

Table 2.

Characteristics of Included Non-Randomised Controlled Trials in the Review

Study	Country	Population	N	Mean Age	Attrition	Control	Program	Theoretical Approach	Program Content	Program Sessions
Berkovich-Ohana et al. 2020	Israel	Elementary teachers	39	NR	NR	None	MBI	Mindfulness and/or relaxation	Applied mindful pedagogy for educators, including psychoeducation, experiential & mindful practices (e.g., body scan, monitoring experiences)	3-month ten sessions delivered over 31 weeks
Beshai et al. 2015 ^a	England	Secondary teachers & staff with direct contact with students	108	NR	17.59	WL	b. Foundations Course	Mindfulness and/or relaxation	Based on MBSR + MBCT	8-week nine 75-minute sessions delivered fortnightly
Carroll et al. 2021	Australia	Elementary & Secondary teachers	83	45.28	7.14	None	MBSR	Mindfulness and/or relaxation	Guided progressive mindfulness meditation practices, body awareness training and gentle yoga	8-week 2.5-hr sessions delivered weekly (plus a day retreat in week 6)
Castillo-Gualda et al. 2019 ^a	Spain	Kindergarten, Elementary & Secondary teachers & counsellors	59	41.12	0.00	NI	RULER	Socio-emotional, relationship, and/or interpersonal skills	SEL, including emotional awareness, vocabulary, expression, & regulation	12-week eight 30-minute sessions
Cheng et al. 2021	China	Kindergarten teachers	70	30.96	0.00	NR	Mindfulness Training Program	Mindfulness and/or relaxation	Based on MBSR + MBCT	4-week four 1.5-hour sessions delivered weekly
Cicotto et al. 2014*	Italy	Elementary teachers	126	45.00	0.00	NI	Psychosocial Training	Socio-emotional, relationship, and/or interpersonal skills	Work-related stress & coping strategies, group dynamics, communication, problem-solving, decision-making	16-week 3-hr modules delivered frequently
Dahal & Pradhan 2018*	India	Secondary teachers	62	37.42	NR	WL	Cyclic Meditation	Mindfulness and/or relaxation	Meditation practice including prayer, relaxation, centering, sitting asanas	4-week twenty sessions delivered daily
de Souza et al. 2016*	Brazil	Elementary & Secondary teachers	84	45.50	55.17	WL	Sleep Education Program	Other	Sleep education, including physiological & behavioural characteristics, mechanisms of regulation, sleep hygiene	8-week four 4-session delivered fortnightly
Dicke et al. 2015 ^{a,b}	Germany	Pre-service teachers	61	27.60	42.86	WL	Stress Management Training	Stress management skills	Based on German AGIL Training, including Psychoeducation, stress & time management strategies, PMR	Two 8-session
Dyer et al. 2020 ^a	USA	Education professionals	31	47.50	22.22	WL	RISE program	Mindfulness and/or	Psychoeducation, guided	3-day residential

		(teachers, counsellors, technology specialists, librarians)						relaxation	meditation & relaxation, focusing techniques	progra hrs da
Fabbro et al. 2020*	Italy	Kindergarten, Elementary & Middle teachers	39	50.81	0.00	WL	MOM	Mindfulness and/or relaxation	Psychoeducation, mindfulness meditation techniques including mindful breathing, body scan, observation of states of mind	8-week eight 1 sessio deliver weekly
Forman 1982*	USA	Secondary teachers	30	NR	20.00	WL	CB-SMP	Cognitive-behavioural skills	Based on stress inoculation, including psychoeducation, relaxation, cognitive restructuring	6-week 3-hr sessio deliver weekly
Frank et al. 2015 ^a	USA	Secondary teachers, counsellors, principals, nurses, librarians	36	40.72	NR	WL	MBSR	Mindfulness and/or relaxation	Mindfulness meditation, including body scan & awareness	8-week eight 2 sessio deliver weekly
Friedman et al. 1983	USA	Elementary & Secondary teachers	85	35.00	NR	NR	Stress Management	Cognitive-behavioural skills	Cognitive coping skills & relaxation skills for stress	5-week two to 2-hr sessio either deliver weekly self-directe
Goetz et al. 2013*	Germany	Teachers (type not specified)	95	47.40	17.64	NI	AFA Breathing Therapy	Mindfulness and/or relaxation	Holistic approach with focus on perception of breathing, including listening to breath, experiencing the body during movement & relaxation, continuous mindfulness	11 ses deliver weekly
Gouda et al., 2016	Germany	Secondary teachers	29	45.90	0.00	WL	MBSR	Mindfulness and/or relaxation	Psychoeducation & mindfulness meditation, including body scan & awareness	8-week eight 2 sessio deliver weekly
Hall et al., 1997	NR	Pre-service teachers	84 ^a	NR	2.38 ^a	NI	Human Relations Training	Socio-emotional, relationship, and/or interpersonal skills	Interpersonal skills development, counselling skills, Rogerian style process group	2-year course conser 10-wex terms) hrs deliver weekly
Johnson &	South	Secondary teachers	26	NR	NR	NI	Transpersonal	Other	Emotion-oriented	10-wex

Naidoo 2017*, ^b	Africa						Psychology Workshops		intervention, including mindfulness, visualisation	ten 1.5 sessions delivered weekly
Johnson & Naidoo 2013*	South Africa	Elementary & Secondary teachers	57	NR	10.00	NI	Transpersonal Psychology Workshops	Other	Emotion-oriented intervention, including mindfulness, visualisation	6 days sessions delivered daily
Larsson et al. 1990*	Sweden	Secondary teachers	118	42.33	34.12	NI	Stress Control Programme	Stress management skills	Cognitive-behavioural strategies, including psychoeducation & relaxation exercises	Five to eight 1 sessions delivered 2-3-week intervals
Leung et al. 2011*	China	Secondary teachers	161	NR	NR	WL	Brief CB-SMP	Cognitive-behavioural skills	Psychoeducation, cognitive-behavioural therapy principles including thought identification and restructuring, pleasurable activities, & relaxation	1 session
Luong et al. 2019*	Germany	Secondary teachers	96	45.16	8.00	WL	MBSR	Mindfulness and/or relaxation	Mindfulness meditation, including body scan & awareness	8-week eight 2 sessions delivered weekly
Mahmoodabad et al. 2014*	Iran	Elementary teachers	200	41.65	NR	None	Transactional Model Based Teaching Program	Socio-emotional, relationship, and/or interpersonal skills	Cognitive-behavioural strategies, including psychoeducation, coping strategies, self-efficacy, time management, social relationships, physical stress management	Eight 1 hr sessions
Miyahara et al., 2017	Japan	Pre-service teachers	60	NR	33.33	None	Sitting Meditation	Mindfulness and/or relaxation	Based on guided mindfulness meditation	One 30 min session
Munday et al., 1995	USA	Pre-service teachers	35	NR	NR	NI	Stress Management Training	Stress management skills	Cognitive-behavioural strategies, including psychoeducation, breathing techniques, stretching, cognitive skills, PMR, relaxation, mental quieting	2-week four sessions (5hr in total), delivered twice per week
Schnaider-Levi et al. 2020	Israel	Secondary teachers	60	46.40	NR	NI	IBSR	Cognitive-behavioural skills	Cognitive reframing program, including thought identification & challenging, guided reflection	12-week 12 4.5 sessions delivered weekly (3.5hr group individual)
Shimazu et al. 2003*	Japan	Elementary & Secondary teachers	24	44.40	33.33	WL	Stress Management Program	Stress management skills	Combined cognitive behavioural training & relaxation training, including psychoeducation,	Five 2-session delivered 2-4 week intervals

									PMR, coping strategies to manage classroom stressors	
Siu et al 2014*	Hong Kong	Elementary & Secondary teachers	100	38.58	0.00	NR	Stress Management Program	Stress management skills	Psychoeducation, & skills drawn from cognitive behavioural therapy, emotion regulation, positive psychology, & conflict management (e.g., relaxation, mindfulness, effective communication, & recovery)	2.5 days per week
Song et al. 2020 ^a	China	Elementary, Middle, Secondary, College, University teachers	161	38.50	NR	WL	Mindfulness Training	Mindfulness and/or relaxation	Adapted from MBSR, including psychoeducation, sitting meditation, mindful eating, body scan	4 days 8hrs per day
Telles et al. 2018*	India	Elementary teachers	236	41.90	0.00	NI	Residential Yoga Program	Mindfulness and/or relaxation	Physical postures & exercises, breathing techniques, chanting, guided relaxation	15 days 6hrs per day
Thephilah et al., 2020	India	Secondary teachers	28	NR	NR	NR	Autogenic Relaxation Training	Mindfulness and/or relaxation	Relaxation training, including psychoeducation	6-week 2-hr sessions delivered weekly
Todd et al., 2019	United Kingdom	Elementary & Secondary teachers	44	41.25	66.67	None	MBSR	Mindfulness and/or relaxation	Mindfulness meditation, including body scan & awareness	8-week eight 2 sessions delivered weekly
Tsang et al. 2015*	Hong Kong	Elementary teachers	93	38.43	21.28	WL	Stress Management Program	Cognitive-behavioural skills	Based on CBT & CAM, including cognitive restructuring, self-management, relaxation, mindfulness, aromatherapy, acupressure	6-week 2-hr sessions
Vesely et al. 2014*	Canada	Pre-service teachers	49	26.50	0.00	NI	Managing Occupational Stress through the Development of EI	Socio-emotional, relationship, and/or interpersonal skills	Based on Swinburne EI Model, including emotional self-awareness & expression, reasoning, self-management, management of others, self-control	5-week five 1-hr sessions delivered weekly
Wimmer et al. 2019*, ^b	Germany	Pre-service teachers	154	NR	7.84	NI + AM	MBSR	Combination	Mindfulness meditation, including body scan & awareness, including ACT and Dialectical	12-week eight 1 sessions delivered twice per week

									Behaviour Therapy	
Winzelberg & Lusk 1999	USA	Pre-service teachers	21	24.50	NR	WL	RISE Program	Mindfulness and/or relaxation	Psychoeducation, guided meditation & relaxation, focusing techniques	4-week four 45-min sessions delivered weekly
Zadok-Gurman et al. 2021*	Israel	Teachers (type not specified)	67	45.00	8.57	NI	IBSR	Combination	Based on principles and skills of observation, self-exploration, cognitive reframing, and empowerment.	20-week ten 2.5 biweekly group meetings and biweekly 1.5-hr individual sessions

Note. * = Studies included in the meta-analysis; ^a = includes samples other than teachers, including counsellors/psychologists, administrative staff, principals, parents, affiliated family consultants, managers, learning support etc. *N*, mean ages, and dropout reported in Table 1 for these studies include the whole sample; ^b = These studies included more than one intervention group. Only the relevant intervention was selected for inclusion in this review and meta-analysis, which is reported in Table 1 (see "Program" column). The total sample sizes reported for these studies only include the relevant intervention and the control group/s. The mean ages and dropout reported in Table 1 for these studies only include the relevant groups if they were reported. NR=information not reported.

N – Total number of participants allocated to groups. **Mean Age** – Mean age of the allocated sample at baseline, unless otherwise specified. **Attrition** – Number of participants lost to drop out in the intervention group only, measured after the final follow up measurement time point. **Control group** – WL=wait-list control, NI=no intervention control (including treatment as usual), None=a comparison group was used rather than a control group; AMC=attention matched control. **Program Content** – MBI=Mindfulness-Based Intervention; MBSR=Mindfulness Based Stress Reduction; MBCT=Mindfulness Based Cognitive Therapy; RULER=Recognising, Understanding, Labeling, Expressing, and Regulating Emotion; MOM=Mindfulness-Oriented Meditation; SEL=Socio-Emotional Learning; PMR=Progressive Muscle Relaxation; CB-SMP=Cognitive Behavioural Stress Management Program; IBSR=Inquiry-Based Stress Reduction; CAM=Complementary and Alternative Medicine; EI=Emotional Intelligence. **Outcome Measures** – PSS=Perceived Stress Scale; WEMWBS=Warwick-Edinburgh Mental Well-Being Scale; MBI-ES-EE=Maslach Burnout Inventory – Educator Survey – Emotional Exhaustion Subscale; MBI-EE=Maslach Burnout Inventory – Emotional Exhaustion Subscale; BOJSM=Brief Overall Job Satisfaction Measure; GHQ-SS=General Health Questionnaire – Somatic Symptoms Subscale; GHQ-AI=General Health Questionnaire – Anxiety and Insomnia Subscale; GHQ-D=General Health Questionnaire – Depression Subscale; PSQI=Pittsburgh Sleep Quality Index; QSS=Quality of Sleep Scale; SWLS=Satisfaction with Life Scale; PANAS-P=Positive and Negative Affect Scale – Positive; PANAS-N=Positive and Negative Affect – Negative; RS=Resilience Scale; TSI=Teacher Stress Inventory; STAI-S=State-Trait Anxiety Inventory – State Subscale; BSI-D=Brief Stress Inventory – Depression Subscale; BSI-A=Brief Stress Inventory – Anxiety Subscale; BSI-S=Brief Stress Inventory – Somatisation Subscale; SSS=Subjective Stress Scale; AVEM-SW=Work-Related Behaviour and Experience Patterns – Satisfaction with Work; PSQ=Perceived Stress Questionnaire; HADS-D=Hospital Anxiety and Depression Scale – Depression Subscale; HADS-A=Hospital Anxiety and Depression Scale – Anxiety Subscale; CBI-WS=Copenhagen Burnout Inventory – Work Subscale; BAI=Beck Anxiety Inventory; SP-ESR=Stress Profile – Emotional Stress Reactions Subscale; SP-GW=Stress Profile – General Wellbeing Subscale; DASS-D=Depression Anxiety Stress Scale – Depression Subscale; DASS-A=Depression Anxiety Stress Scale – Anxiety Subscale; DASS-S=Depression Anxiety Stress Scale – Stress Subscale; SRS=Stress Response Scale; BJSQ-D=Brief Job Stress Questionnaires – Depression Subscale; BJSQ-A=Brief Job Stress Questionnaires – Anxiety Subscale; BJSQ-SSR=Brief Job Stress Questionnaires – Somatic Stress Response Subscale; BJSQ-F=Brief Job Stress Questionnaires – Fatigue Subscale; ASSET-PW=An Organisational Stress Screening Tool – Psychological Well-being Scale; TSI-EM=Teacher Stress Inventory – Emotional Manifestations Subscale; TSI-FM=Teacher Stress Inventory – Fatigue Manifestations; OSI-MWS=Occupational Stress Indicator – Mental Wellbeing Scale; OASIS=Overall Anxiety Severity and Impairment Scale; RSCA-A-R=Resiliency Scale for Children and Adolescence – Adult Version Revised – Emotional Reactivity Subscale; PERMA=Positive Emotion, Engagement, Relationships, Meaning, and Accomplishment scale; BRS=Brief Resilience Scale.

Table 3. *ROB-II Judgments for each Domain*

Authors	Randomisation	Deviation	Missing	Outcome	Reporting	Overall
Ancona et al. 2014	High	SC	Low	SC	SC	High
Ansley et al. 2021	SC	Low	High	SC	SC	High
Au et al. 2016	SC	High	SC	SC	SC	High
Benn et al. 2012	SC	Low	High	SC	SC	High
Berger et al. 2016	Low	SC	Low	SC	SC	SC
Bertoch et al. 1989	SC	SC	SC	SC	SC	SC
Biglan et al. 2013	SC	Low	Low	SC	SC	SC
Castillo-Gualda et al. 2017	SC	Low	Low	SC	SC	SC
Cecil et al. 1990	SC	Low	SC	SC	High	High
Chan et al. 2013	SC	Low	Low	Low	SC	SC
Cheek et al. 2003	SC	Low	High	Low	High	High
Cook et al et al. 2017	SC	Low	High	SC	SC	High
Cooley et al. 1996	SC	Low	High	SC	High	High
De Carvalho et al. 2021	Low	Low	Low	SC	SC	SC
Dike et al. 2021	Low	Low	Low	SC	SC	SC
Ebert et al. 2014	SC	Low	Low	SC	Low	SC
Figl-Hertlein et al. 2014	High	SC	High	SC	SC	High
Flook et al. 2013	SC	Low	High	SC	SC	High
Franco et al. 2013	SC	Low	High	SC	SC	High
Grant et al. 2010	SC	Low	High	SC	SC	High
Harris et al. 2016	High	Low	Low	SC	SC	High
Hwang et al. 2019	High	Low	High	High	SC	High
Igbokwe et al. 2019	SC	SC	Low	SC	SC	SC
Jeffcoat et al. 2012	Low	Low	Low	SC	SC	SC
Jennings et al. 2011	SC	SC	Low	SC	SC	SC
Jennings et al. 2013	SC	SC	Low	SC	SC	SC
Jennings et al. 2017	Low	SC	Low	SC	SC	SC
Jennings et al. 2019	Low	SC	Low	SC	SC	SC
Kaspereen et al. 2012	Low	SC	SC	SC	SC	SC
Montero-Marin et al. 2021	SC	Low	Low	SC	SC	SC
Nwabuko et al. 2019	Low	SC	High	SC	SC	High
Ogba et al 2020	Low	Low	Low	SC	SC	SC
Onuigbo et al. 2018	Low	SC	Low	SC	SC	SC
Pozo-Rico et al. 2021	SC	High	High	SC	SC	High
Rao et al. 2017	Low	SC	Low	SC	SC	SC
Roeser et al. 2013	High	SC	Low	High	SC	High
Schloss et al. 1983	SC	SC	High	SC	SC	High
Schoeps et al. 2019	High	SC	High	SC	SC	High
Sharp et al. 1985	High	SC	High	SC	SC	High
Sottimano et al. 2018	SC	Low	Low	SC	SC	SC
Tunnecliffe et al. 1986	High	SC	High	SC	SC	High
Tsang et al. 2021	SC	Low	Low	SC	SC	SC
Ugwoke et al. 2018	Low	Low	Low	SC	Low	SC

Unterbrink et al 2012	Low	High	High	SC	SC	High
Wu et al. 2006	SC	SC	High	SC	SC	High
Zolnierczyk-Zreda et al. 2005	SC	SC	Low	SC	SC	SC

Note. SC=some concerns.

Table 4. *ROBINS-I Risk of Bias Judgments for each Domain*

Authors	Confounding	Selection	Deviation	Missing	Outcomes	Reporting	Overall
Berkovich-Ohana et al. 2020	Serious	Low	Low	NI	Serious	Serious	Serious
Beshai et al. 2015	Moderate	Low	Low	Serious	Serious	Low	Serious
Carroll et al. 2021	Moderate	Low	Low	Low	Serious	Low	Serious
Castillo-Guialda et al. 2019	Moderate	Low	Low	Low	Serious	Serious	Serious
Cicotto et al. 2014	Serious	Low	Low	Low	Serious	Serious	Serious
Cheng et al. 2021	Serious	Low	Low	Low	Serious	Low	Serious
Dahal & Pradhan 2018	Moderate	Low	Low	NI	Serious	Low	Serious
de Souza et al. 2016	Serious	Low	Low	Serious	Serious	Serious	Serious
Dicke et al. 2015	Moderate	Low	Low	Low	Serious	Low	Serious
Dyer et al. 2020	Serious	Low	Low	Serious	Low	Serious	Serious
Fabbro et al. 2020	Serious	Low	Low	Low	Serious	Low	Serious
Forman 1982	Serious	Low	Low	Serious	Serious	Moderate	Serious
Frank et al., 2015	Moderate	Low	Low	NI	Serious	Low	Serious
Friedman et al., 1983	Moderate	Low	Low	NI	Serious	Serious	Serious
Goetz et al. 2013	Moderate	Low	Low	Serious	Serious	Low	Serious
Gouda et al., 2016	Moderate	Low	Low	Low	Serious	Low	Serious
Hall et al., 1997	Serious	Low	Low	Low	Serious	Serious	Serious
Johnson & Naidoo 2017	Moderate	Low	Low	Low	Serious	Low	Serious
Johnson & Naidoo 2013	Moderate	Low	Low	Low	Serious	Serious	Serious
Larsson et al. 1990	Serious	Low	Low	Serious	Serious	Serious	Serious
Leung et al. 2011	Moderate	Low	Low	Critical	Serious	Serious	Critical
Luong et al. 2019	Moderate	Low	Low	Low	Serious	Low	Serious
Mahmoodabad et al. 2014	Moderate	Low	Low	NI	Serious	Serious	Serious
Miyahara et al., 2017	Serious	Low	Low	Low	Serious	Low	Serious
Munday et al., 1995	Serious	Low	Low	NI	Serious	Serious	Serious
Schnaider-Levi et al. 2020	Moderate	Low	Low	NI	Serious	Low	Serious
Shimazu et al. 2003	Serious	Low	Low	Serious	Serious	Low	Serious
Siu et al 2014	Critical	Low	Low	Low	Serious	Serious	Critical
Song et al. 2020	Serious	Low	Low	NI	Serious	Serious	Serious
Telles et al. 2018	Serious	Low	Low	Low	Serious	Serious	Serious
Thephilah et al., 2020	Serious	Low	Low	NI	Serious	Critical	Critical
Todd et al., 2019	Serious	Low	Low	Serious	Serious	Low	Serious
Tsang et al. 2015	Moderate	Low	Low	Low	Serious	Low	Serious
Vesely et al. 2014	Serious	Low	Low	Low	Serious	Serious	Serious
Wimmer et al. 2019	Moderate	Low	Low	Serious	Serious	Low	Serious
Winzelberg & Luskin 1999	Serious	Low	Low	Moderate	Serious	Serious	Serious
Zadok-Gurman et al. 2021	Moderate	Low	Low	Moderate	Serious	Low	Serious

Note. NI=no information.

Table 5. *RCT Heterogeneity Statistics for the Primary Analyses at Post-Intervention*

	Heterogeneity Statistics					
	<i>Q</i>	<i>df</i>	<i>p</i>	ρ	CI _{lower}	CI _{upper}
Primary Outcomes						
Depression	1.07	2	.59	0.00	0.00	93.72
Anxiety	1.93	1	.17	48.21	-	-
Stress	98.66	7	< .001	92.91	88.34	96.68
Psychological distress	51.23	1	< .001	98.05	-	-
Burnout	38.64	8	< .001	79.23	61.22	88.95
Wellbeing	9.06	3	.03	66.90	3.27	88.67

Note. Confidence interval estimates cannot be calculated when *df*<2.

Table 6. *Non-Randomised Controlled Trial Heterogeneity Statistics for the Primary Analyses at Post-Intervention*

	Heterogeneity Statistics					
	<i>Q</i>	<i>df</i>	<i>P</i>	ρ	CI _{lower}	CI _{upper}
Primary Outcomes						
Depression	8.37	5	.14	40.28	0.00	76.32
Anxiety	19.08	8	.01	58.08	12.19	79.98
Stress	18.94	8	.02	57.77	11.44	79.85
Burnout	3.92	3	.37	23.40	0.00	69.73
Wellbeing	10.49	6	.08	42.82	0.00	75.96
Somatisation	6.44	1	.01	84.47	-	-

Note. Confidence interval estimates cannot be calculated when *df*<2.

Figures

Figure 1

PRISMA Flow Diagram

Supplementary Files

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- [Appendix.docx](#)