

The effectiveness of training workplace managers to understand and support the mental health needs of employees: a systematic review and meta-analysis.

*Aimée Gayed, MCrim*¹

Josie S. Milligan-Saville, BPsych(Hons)^{1,2}

*Jennifer Nicholas, BSc(Hon)*¹

Bridget T. Bryan, BA(Hons)^{1,2}

Anthony D. LaMontagne, ScD^{3,4}

*Allison Milner, PhD*⁴

Ira Madan, MD^{5,6}

*Rafael A. Calvo, PhD*⁷

*Helen Christensen, PhD*²

Arnstein Mykletun, PhD^{1,8,9,10}

*Nicholas Glozier, PhD*¹²

Samuel B. Harvey, PhD^{1,2}

¹ School of Psychiatry, University of New South Wales, Sydney, Australia

² Black Dog Institute, Sydney, Australia

³ Centre for Population Health Research, Deakin University, Geelong, Victoria, Australia

⁴ School of Population and Global Health, The University of Melbourne, Melbourne, Australia

⁵ Occupational Health Department, The Education Centre, St Thomas' Hospital, Westminster Bridge Road, London, SE1 7EH, UK

⁶ King's College London, London, UK

⁷ School of Electrical and Information Engineering, University of Sydney, Sydney, Australia

⁸ Department of Mental Health and Suicide, Norwegian Institute of Public Health, Oslo, Norway

⁹ Department of Community Medicine, University of Tromsø, Tromsø, Norway

¹⁰ Centre for Work and Mental Health, Nordland Hospital Trust, Bodø, Norway

¹¹ Centre for Research and Education in Forensic Psychiatry and Psychology, Haukeland University Hospital, Bergen, Norway

¹² Brain and Mind Centre, Sydney Medical School, University of Sydney, Sydney, Australia

Corresponding Author:

Ms Aimée Gayed

School of Psychiatry, University of NSW, Black Dog Institute Building, Hospital Road
Randwick, NSW, Australia. 2031

Email: a.gayed@unsw.edu.au

Ph: +61 2 9382 4517

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Abstract

Objective: Managers are in an influential position to make decisions that can impact on the mental health and well-being of their employees. As a result, there is an increasing trend for organisations to provide managers with training in how to reduce work-based mental health risk factors for their employees.

Method: A systematic search of the literature was conducted to identify workplace interventions for managers with an emphasis on the mental health of employees reporting directing to them. A meta-analysis was performed to calculate pooled effect sizes using the random effects model for both manager and employee outcomes.

Results: Ten controlled trials were identified as relevant for this review. Outcomes evaluating managers' mental health knowledge (SMD=0.73; 95% CI:0.43-1.03; $p<0.001$), non-stigmatising attitudes towards mental health (SMD=0.36; 95% CI:0.18-0.53; $p<0.001$) and improving behaviour in supporting employees experiencing mental health problems (SMD=0.60, 95% CI:0.14-1.08, $p=0.01$) were found to have significant pooled effect sizes favouring the intervention. A significant pooled effect was not found for the small number of studies evaluating psychological symptoms in employees ($p=0.28$).

Conclusions: Our meta-analysis indicates that training managers in workplace mental health can improve their knowledge, attitudes, and self-reported behaviour in supporting employees experiencing mental health problems. At present, any findings regarding the impact of manager training on levels of psychological distress amongst employees remains preliminary as only a very limited amount of research evaluating employee outcomes is available. Our review suggests that in order to understand the effectiveness of manager training on employees, an increase in collection of employee level data is required.

Keywords: manager training, workplace mental health, mental health education, occupational health

Introduction

Mental illness has become the leading cause of long-term sickness absence and work incapacity across many high-income countries ¹⁻³. Depression, anxiety and stress-related disorders are the most common mental health conditions seen in the workplace ⁴. Although these conditions are treatable and often preventable ⁴⁻⁶, they can also cause prolonged sickness absence, and impact on the wellbeing and occupational functioning of those affected ^{7,8}. For some, the workplace may also be a contributing factor to the development or persistence of their mental health condition ⁹. Conflicting and excessive work demands, a lack of job control, and poor collegial support have all been identified as primary sources of work-related stress that can impact upon employees' well-being and productivity ¹⁰.

It has been recognised that certain workplace strategies and practices have the potential to positively or negatively modify these risk factors ^{4,11}, which has prompted an increase in the implementation of workplace-based mental health and well-being interventions ¹⁰. These interventions aim to provide staff members across the organisation with knowledge and skills to effectively identify, address and manage modifiable workplace risk factors and promote mental health and well-being ¹².

To date, workplace mental health interventions vary with regards to content, delivery method, training duration, and target audience. For example, certain programs are designed for all staff, whilst other interventions specifically target employees or managers. Manager training may focus on managers' own mental health and skills to regulate certain job-related stressors. Alternatively, manager training may be specific to understanding the mental health needs of their direct reports. This latter format has evolved from a growing understanding of the important role managers may play in the mental health of their employees ^{13,14}. Managers' knowledge of workplace issues and their ability to implement adjustments to working

conditions place them in an influential position to manage work-based mental health risk factors and improve the well-being of their staff.

A small body of research has evaluated specialised training for managers to promote understanding of mental health problems among workers, with evidence suggesting that managers value such initiatives and feel more confident in discussing mental health matters after receiving training in this area ^{2 3}. This research has also found that employees of managers who have received such training may experience reduced psychological distress and increased well-being ^{3 15 16}. However, certain studies have not found such strong positive effects for managers ¹⁷ and in some cases, benefits of manager training may not be evident for the managers' direct reports ^{18 19}.

The aim of this systematic review and meta-analysis is to examine the available evidence on the efficacy of workplace training interventions developed for managers, targeting the mental health of employees reporting directly to them. Specifically, this review aims to identify what is targeted through such training, determine what outcomes can be positively impacted upon by these interventions for both managers and their employees, and over what period any positive effects may be observed.

Methods

Consistent with the guidelines outlined in the *PRISMA statement for systematic reviews* ²⁰, a comprehensive search of the literature published up to and including 14 August 2017 using subject headings and keywords associated with 'training', 'mental health', 'manager', and 'controlled trial' was conducted in MEDLINE, PsycINFO, EMBASE, the Cochrane Central Register of Controlled Trials (CENTRAL) and PubMed online academic databases. The full

reference list of selected papers and a relevant 2011 systematic review³ were also searched to identify any other publications meeting the inclusion criteria. Supplementary Table 1 outlines the specific search strategy used in each database.

To reduce publication bias²¹, a search of the WHO International Clinical Trials Registry Platform (ICTRP) to identify other relevant studies currently being undertaken, was conducted with the more general search terms ‘manager’ AND ‘mental health’. Authors of trials that potentially met criteria were contacted to request available data.

Inclusion criteria

The aim of this review was to assess the overall efficacy of workplace mental health education delivered to managers that targeted their employees’ mental well-being. Evaluations of manager mental health education without specific emphasis on the mental health of direct reports did not meet criteria and were excluded.

Included trials were those that reported outcomes on managers’ knowledge, attitudes, or behaviour regarding workplace mental health issues, and/or assessment of direct reports’ mental health, sickness absence, or perceptions of supervisor support. To meet inclusion, studies were required to have compared the intervention of interest with a control or wait-list group.

Selection Process

Once duplicates were removed, two researchers (A.G. and J.N.) independently screened the titles and abstracts of the identified articles for relevance. Studies that did not meet the

inclusion criteria were excluded. To ascertain the relevance of the remaining papers, full-text versions were analysed to determine which met criteria and would be included in the review. A senior researcher (S.B.H) was consulted on studies for which consensus was not initially obtained. To determine consistency among researchers, an interrater reliability analysis was performed using the Kappa statistic.

Quality Assessment

The Downs and Black checklist²² was used to assess the methodological strengths and weaknesses of the included papers. This checklist has been found to be appropriate to assess the quality of both randomised and non-randomised controlled trials, making it a suitable choice for this review. The checklist demonstrates high internal consistency ($r=0.89$), criterion validity ($r=0.90$) and test-retest reliability ($r=0.88$) with good inter-rater reliability ($r=0.75$). It consists of 27 items comprising five subscales that measure reporting (10-items), external validity (3-items), bias (7-items), confounding (6-items) and power (1-item). In line with previous reviews (e.g. ^{23 24}) the original scoring for question 27, assessing whether there was sufficient power to detect a clinically important effect, was simplified to a score of either zero or one. With the inclusion of this modification, all items, with the exception of one (item-5), were given a rating of either 1 (=yes) or 0 (=no/unable to determine). Responses on item-5, were rated as either 2 (=yes), 1 (=partially) or 0 (=no). The maximum score possible with the modified scoring was 28. A final score of 26-28 reflected excellent quality research, 20-25 was considered good quality, and 15-19 was fair²³. Any papers that were evaluated as 14 or less were considered poor quality.

The quality assessment was carried out independently by the same two researchers who completed the screening and selection process. An additional researcher was consulted on

particular papers if discrepancies arose. Unpublished studies identified through the ICTRP were unable to undergo quality assessment.

Data Extraction

Data from each paper was extracted for the following variables; sample characteristics, research design, implementation characteristics, length of the longest follow-up, and outcome indicators. Meta-analytic data on four of the six outcomes identified in the included trials was generated. Three outcomes were self-reported manager outcome variables: managers' 1) knowledge about mental health in the workplace and their role in managing an employee experiencing mental ill health, 2) attitudes towards mental health in the workplace, and 3) behaviour in dealing with a direct employee experiencing mental health problems. The fourth outcome variable evaluated levels of psychological distress among the employees of the managers in the intervention and control groups. The number of studies available investigating employees' perception of psychological support from their managers or employee rates of sickness absence was inadequate for the purpose of a meta-analysis, and therefore data for these outcomes was not included.

Data Synthesis/Statistical Analysis

Comprehensive Meta-Analysis (CMA) software version 3 was used to perform the meta-analysis. Separate meta-analyses were conducted for each of the outcomes of interest where at least five controlled trials looked at that same outcome. As all the studies measured the outcomes using varying psychometric scales, a comparison of the scores between the intervention and control groups was calculated to obtain the standardised mean difference

(SMD). SMD could be calculated using the means, standard deviations and sample sizes from nine of the studies. For the behaviour outcome in Milligan-Saville et al.²⁵ and for all outcomes in Moffit et al.²⁶, sufficient information in the form of p-values and sample sizes could be extracted for SMD calculation. The SMD was used to represent the effect size measure in terms of standard deviations. In general, large, medium and small effect sizes are considered to be 0.8, 0.5 and 0.2 respectively²⁷.

Where studies had more than one follow-up time point, the final time point was used in the meta-analysis^{17 28}. If studies included more than one intervention group²⁶, or had more than one variable assessing the same outcome²⁵, the mean effect size was used. For cluster RCTs, effective sample sizes were calculated as described in the Cochrane Handbook²⁹. If an intra-cluster correlation (ICC) was not provided within the study, a conservative assumption of a large ICC of 0.1 was made.

The pooled mean effect sizes for the outcomes were expressed as SMD with 95% confidence intervals (95% CI). To account for heterogeneity expected due to methodological and population diversity of the included studies, pooled effect sizes using the random effects model were calculated. In addition, Cochran's Q-statistic and the I^2 statistic were used to test for the presence and magnitude of heterogeneity. The presence of heterogeneity with the Cochran's Q-statistic was indicated by a p-value of <0.1 ²⁹. The I^2 statistic was reported to measure the degree of inconsistency across studies³⁰ as a percentage of the variability in effect estimates across studies due to heterogeneity rather than chance^{29 30}. An I^2 statistic of 0% would indicate no observed heterogeneity, with low, medium and high inconsistency being represented with I^2 statistic values of 25%, 50% and 75% respectively³⁰. Separate sensitivity analyses were planned *a priori* for manager outcomes from studies which evaluated interventions using an RCT and that scored fair or above on the Downs and Black Checklist. A separate sensitivity analysis was also planned for employee outcomes that had a

follow-up period of greater than 3 months. Post-hoc analyses were conducted where possible for each of the four meta-analyses stratified by intervention delivery format (face-to-face v online), country of origin (Japan v other) and content (awareness only v awareness plus skill development).

Publication bias is the unrepresentative reporting of research findings due to the tendency of manuscripts to be submitted and accepted based on the strength and direction of the findings²¹. The fail-safe number was reported for outcomes with significant effects. This number was used to indicate the number of additional studies with a null finding that would be required to increase the p-value of the meta-analysis to above 0.05^{29 31}.

Results

Search results and included studies

A total of 1332 unique records were identified through the initial database search. A flow diagram demonstrating the process of study selection is shown in Figure 1. Researchers independently reviewed the 1332 titles and abstracts, and identified 55 relevant papers for full-text screening. Evaluation of the full-text versions identified 8 papers that met all inclusion criteria and were included in the quality assessment in preparation for the final meta-analysis^{16-19 25 26 28 32 33}. The interrater reliability for the screening process was Kappa = 0.65 (95% CI:0.52-0.78). The quality assessment process using the Downs and Black checklist²² identified 4 papers as 'good', 3 as 'fair', and one paper²⁶ was rated as 'poor' quality.

The search of the ICTRP identified one unpublished study that met the inclusion criteria²⁵.

The authors were contacted and provided statistics for the purpose of the meta-analysis. As a

result, the number of papers identified was nine, although as one paper²⁸ provided data from two studies, a total of ten studies were included in the final meta-analysis.

The ten selected studies were conducted in a variety of organisational settings including emergency services, manufacturing companies, office settings, health services and tertiary institutions, with sample sizes varying from 16 to 286 managers. Of the 10 studies, five were conducted in Japan, with the remainder from Canada, UK and Australia. Seven studies evaluated face-to-face interventions ranging from 2.25 hours to 14 hours, two were delivered online over a 4-week period, and the final involved a combination of e-learning and face-to-face methods with 2.5 hours of material delivered over 10-weeks. A range of content areas were targeted through the various interventions including mental health awareness and knowledge, promoting positive workplace and employee focused mental health, skill development to best support and respond to employee mental health issues, and promoting management standards to reduce work related stress. Table 1 summarises the characteristics of the included studies evaluating workplace intervention programs for managers.

Table 1. Summary of studies included in meta-analysis evaluating workplace intervention programs for managers.

Study	Subjects (sample size)	Design	Intervention description	Measures	Follow up	Results	Downs and Black Checklist rating
Dimoff <i>et al.</i> (2016). Study 1 ²⁸	Managers and supervisors (n=43) at a University, Canada.	RCT	Mental Health Awareness Training for managers educating and building skills to early identify and recognise, appropriately engage or take action, and assess, plan and monitor. Face-to-face delivery. 3- hours long.	MHKS PDSS GSES SS	8 weeks	Managers: Intervention group had a significant increase in knowledge, self-efficacy, attitudes, and intent to promote mental health at work. Employee/Direct Reports: Did not assess.	17
Dimoff <i>et al.</i> (2016). Study 2 ²⁸	Managers and supervisors (n=142) at a telecommunications company, Canada.	Cluster RCT	Mental Health Awareness Training for managers educating and building skills to early identify and recognise, appropriately engage or take action, and assess, plan and monitor. Face-to-face delivery. 3- hours in length.	MHKS PDSS GSES SS	9 months	Managers: Intervention group had a significant increase in knowledge, self-efficacy, attitudes, and intent to promote mental health at work. Employee/Direct Reports: Reduction in the duration of short-term disability claims.	17
Kawakami <i>et al.</i> (2005) ³²	Section Chiefs (n=16) and their Subordinates (n=166) from a computer engineering company, Japan.	RCT	"E-Learning Worksite Mental Health for Supervisors" training. Web-based delivery. Average of 3-5 hours over a 4-week training period. Focusing on worksite mental health, job stressors, supervisor support and psychological distress among subordinates.	ADQ BJSQ-32	3-months	Managers: Intervention group outcomes not compared to a control group at the manager level. Employee/Direct Reports: Perceptions of supervisor support maintained for subordinates of intervention group but decreased significantly for subordinates of control.	21
Kawakami <i>et al.</i> (2006) ¹⁹	Supervisors (n=23) and their Subordinates (n=81) from an office machine sales and service company, Japan.	Cluster RCT	"E-Learning Worksite Mental Health for Supervisors" training. Web-based delivery. Average of 3-5 hours over a 4-week training period. Focusing on worksite mental health, job stressors, supervisor support and psychological distress among subordinates.	ADQ BJSQ-57	3-months	Managers: Intervention group outcomes not compared to a control group at the manager level. Employee/Direct Reports: Nil significant intervention effect found amongst subordinates of intervention group compared to subordinates in the control group.	19
Milligan-Saville <i>et al.</i> (2017) ²⁵	Duty commanders (n=128) and their subordinates (n=1966) within a state Fire and Rescue department, Australia.	Cluster RCT	"RESPECT" Manager Training Program. Combining mental health knowledge with a focus on the workplace setting, and communication training to build managers confidence in supporting subordinates' mental health. Face-to-face delivery. 4 hours in length.	SAR ADQ	6-months	Managers: Intervention group had significant increase in likelihood of contacting employees experiencing mental illness or stress and increase in confidence when communicating with them. Employee/Direct Reports: Significant decrease in sickness absence amongst employees whose managers received training compared to other employees.	Unpublished at time of analysis
Moffitt <i>et al.</i> (2014) ²⁶	Line managers (n=89) from a fire service, UK.	RCT	Line Managers in Mental Health Awareness and Promotion. Two interventions evaluated: "Looking after Wellbeing at Work" (LWW) OR Mental Health First Aid (MHFA). Face-to-face delivery. 14 hours.	AMIS MHSQ	Post Intervention	Managers: Significant intervention effect for managers' self-reported attitudes towards mental health and ability to recognise and respond to employees' mental health problems. Employee/Direct Reports: Did not assess.	14
Nishiuchi <i>et al.</i> (2007) ¹⁷	Managers (n=46) at a Sake brewery manufacturer, Japan	RCT	A job stress reduction program for managers promoting positive workplace mental health, early awareness and responses to employee mental health, support for employees returning to work, mental health literacy, and an active listening. Face-to-face delivery. 4 hours long.	ADQ	6-months	Managers: Marginally significant improvement in knowledge and self-reported behaviour for intervention group. Employee/Direct Reports: Did not assess.	20
Stansfield <i>et al.</i> (2015) ¹⁸	Managers (n=60) and their Employees (n=298) at a mental health NHS, UK.	Mixed methods cluster RCT	Blended learning. APP e-learning program for managers on HSE management standards. 2.5 hours in length delivered over 10 weeks, guided by a facilitator and accompanied by face-to-face meetings.	WEMWBS-14 GHQ-12	Post Intervention	Managers: Did not assess. Employee/Direct Reports: Small intervention effect on employees' well-being and levels of psychological distress. Aggregated sickness absence data showed a higher number of days absent for subordinates of managers in the intervention group.	20
Takao <i>et al.</i>	Managers (n=46)	RCT	A job stress reduction program for managers promoting positive	BJSQ-18	3-months	Managers: Did not assess. Employee/Direct Reports: Significant intervention	22

(2006) ¹⁶	and their employees (n=255) at a Sake brewery manufacturer; Japan		workplace mental health, early awareness and responses to employee mental health, support for employees returning to work, mental health literacy, and active listening. Face-to-face delivery. 4 hours long	WHO HWPQ		effect for a) psychological distress and b) job performance for white collar subordinates only of managers who attended training <i>even when adjusting for a) job demands/control and supervisor/co-workers support and b) work environment.</i>	
Tsutsumi <i>et al.</i> (2005) ³³	Supervisors (n=286) and their Subordinates (n=578) at a prefectural office, Japan.	Quasi	A program for managers about their responsibilities in promoting positive mental health, early awareness and responses to subordinates' mental health, supporting employees' returning to work, mental health literacy and active listening. Face-to-face delivery. 2.25 hours.	BJSQ-18 JPC WMHSI JCQ SQ	3-months	Managers: Significant improvement in knowledge for departments where more than 1/3 of supervisors attended training. Employee/Direct Reports: Self-reported stress decreased for employees in departments where more than 1/3 of supervisors attended training.	19

MHKS, Mental Health Knowledge Scale; **PDSS**, Personal Depression Stigma Scale; **GSES**, General Self-Efficacy Scale; **SS**, Safety Scale adapted; **ADQ**, Author developed questionnaires; **BJSQ**, Brief Job Stress Questionnaire; **AMIS**, Attitudes to Mental Illness Scale; **MHSQ**, Mental Health Stigma Questionnaire developed by authors; **WEMWBS**, Employee Wellbeing: Warwick-Edinburgh Mental Wellbeing Scale; **GHQ-12**, General Health Questionnaire; **WHO HWPQ**, WHO Health and Work Performance Questionnaire; **JPC WMHSI** Self-reported job performance checklist taken from World Mental Health Survey Instrument; **JCQ**, Job Content Questionnaire; **SQ**, Supervisory Questionnaire; **SAR**, administrative Sickness Absence Records provided by organisation.

Efficacy of workplace manager mental health training programs for manager outcomes

The relative effect sizes of intervention compared to control groups for the six studies which evaluated managers' mental health literacy and their knowledge of their role in managing employees experiencing mental health problems are presented in Figure 2a. These varied from small effect (SMD=0.33) to a very large effect (SMD=1.32) in favour of the intervention. Overall, this outcome was found to have a large pooled effect size of 0.73 (95% CI:0.43-1.03; $p<0.001$) favouring the intervention. Moderate levels of heterogeneity were detected ($Q=11.25$; $I^2=55.7\%$; $P=0.05$).

Six studies provided data on managers' attitudes towards common mental health issues seen in the workplace. As detailed in Figure 2b, individual effect sizes varied from small negative effects (SMD=-0.04) to moderately positive effects favouring the intervention (SMD=0.68). Overall, a small to moderate pooled effect size (SMD=0.36; 95% CI:0.18-0.53; $p<0.001$) favouring the intervention group was found for the reduction of stigmatising attitudes towards people in the workplace with mental health issues. No heterogeneity was detected for this outcome ($Q=4.83$; $I^2=0\%$; $P=0.44$).

The third outcome evaluated at the manager level was the effect of training on improving managers' behaviour in supporting employees experiencing mental health problems in the workplace. Figure 2c presents the results from the five studies that provided data on this outcome, showing the effect sizes ranging from very small favouring the control group (SMD=-0.04) to very large favouring the intervention (SMD=1.21). A positive pooled effect size favouring the intervention was found (SMD=0.59, 95% CI:0.14-1.03, $p=0.01$). There was evidence of a high level of heterogeneity for this outcome ($Q=15.59$; $I^2=74.34\%$; $P=0.004$).

A sensitivity analysis, including only studies that evaluated outcomes through an RCT which were rated as fair or above according to Downs and Black's checklist, marginally increased the overall pooled effect sizes for each of the three manager outcomes compared to the initial analyses. The significance and direction of the overall pooled effect for manager knowledge (SMD=0.88, 95% CI:0.40-1.35; $P<0.001$), manager attitudes (SMD=0.37, 95% CI:0.06-0.68; $P=0.02$) and manager behaviour (SMD=0.72, 95% CI:0.22-1.22; $P=0.01$) remained the same.

Five post-hoc analyses were able to be conducted across the three manager outcomes. For manager knowledge, stratification based on country of origin (Japan v other) showed significant pooled effect sizes for both groups. However, there was a difference in effect sizes, with the four studies from countries other than Japan (SMD=0.91, 95% CI:0.55-1.27; $P<0.001$) showing higher effect sizes compared to the moderate effect size for the two Japanese studies alone (SMD=0.47, 95% CI:0.22-0.73; $P<0.001$). The single study examining awareness only content had a very large effect size (SMD=1.03, 95% CI:0.42-1.64; $P=0.001$) compared to a moderate effect size for interventions that combined awareness plus skill development (SMD=0.68, 95% CI:0.35-1.01; $P<0.001$).

Manager attitudes were also stratified by country of origin, and by intervention content. When separating studies based on country of origin, the two studies conducted in Japan (SMD=0.24, 95% CI:-0.05-0.53; $P=0.10$) and the four from Canada, UK and Australia (SMD=0.45, 95% CI:0.20-0.69; $P<0.001$) had slightly different pooled effect sizes, with the effect estimate from the Japanese studies becoming non-significant. No difference was found between awareness training (SMD=0.68, 95% CI:0.90-1.28; $P=0.024$) and training containing awareness plus skill development (SMD=0.32, 95% CI:0.14-0.51; $P=0.001$) with both remaining significant.

Finally, stratification based on country of origin for the manager behaviour outcome found a difference between the two Japanese studies (SMD=0.14, 95% CI:-0.14-0.42; $P=0.32$) compared with the three studies from other parts of the world (SMD=0.92, 95% CI: 0.63-1.21; $P<0.001$).

Stratification was not conducted based on format of intervention on any of the manager outcomes, as all included studies were delivered via face-to-face training. Similarly, all studies that evaluated manager behaviour as an outcome provided awareness training in combination with skill building and therefore stratification based on content type could not be conducted for this outcome.

Efficacy of workplace manager mental health training programs for employee outcomes

A limited number of individual studies reported small mixed effects for employee level outcomes. As presented in Figure 3, flow on effects to employees following manager training have yet to be demonstrated for employees' self-reported levels of psychological distress (SMD=-0.08, 95% CI:-0.21-0.06; $P=0.28$). There was no evidence of heterogeneity for this outcome ($Q=1.77$; $I^2=0\%$; $P=0.78$).

A separate meta-analysis was conducted for employee outcomes with a follow-up period of 3 months or greater to examine whether the effects of manager training at the level of employees took longer to be observed. As found with the initial meta-analysis for this outcome, the pooled estimate for overall mean difference for employees' self-reported levels of psychological distress in studies with a follow-up period of 3 months or greater was not significant (SMD=0.08, 95% CI:-0.23-0.38; $P=0.62$).

Post hoc stratification analyses could be conducted for intervention format, country of origin and content type for the employee outcome of psychological distress. One study was excluded from the format of intervention delivery analysis as it provided a combination of face-to-face and online learning, leaving two face-to-face and two online interventions. No difference in effect size or significance was found between face-to-face (SMD=-0.12, 95% CI:-0.30-0.06; $P=0.180$) and online (SMD=-0.09, 95% CI:-0.36-0.18; $P=0.514$) delivery, with both formats remaining insignificant. Similarly, no difference was found between the four Japanese studies (SMD=-0.11, 95% CI:-0.26-0.04; $P=0.16$) and the remaining study conducted elsewhere (SMD=0.11, 95% CI:-0.23-0.46; $P=0.51$). Finally, results did not show an effect on employee psychological distress based on whether their managers were provided awareness training (SMD=-0.09, 95% CI:-0.36-0.18; $P=0.51$) or trained in a combination of awareness and skill building (SMD=-0.07, 95% CI:-0.23-0.09; $P=0.38$).

Analysis of publication bias

The Egger's regression test for asymmetry for managers' knowledge of workplace mental health issues suggests there was no significant publication bias ($P=0.61$). The fail-safe number of 81 indicates that, in order to reduce the pooled effect estimate to non-significance, 81 unpublished studies reporting no effect would be required. For managers' attitudes towards mental health issues in the workplace, the Egger's regression test for asymmetry also suggests no significant publication bias ($P=0.82$), with a fail-safe number of 15. Similarly, there was no evidence of significant publication bias amongst studies examining managers' behaviour in supporting employees' mental health ($P=0.60$) with a fail-safe number of 29. Publication bias was also not present for employees' reported levels of psychological distress ($P=0.33$).

Discussion

This is the first systematic review and meta-analysis examining controlled trials of interventions delivered to managers with a specific emphasis on the mental health of their employees. Our meta-analysis results indicate that managers benefit from specialised, evidence-based interventions to promote understanding of mental health problems experienced by their workers. In particular, manager mental health training appears to increase managers' understanding of mental health issues and their role and responsibility when it comes the mental health of their employees, their attitudes towards mental health in the workplace, and, importantly, their behaviour addressing mental health concerns among their direct reports. These positive outcomes for managers appear to persist over time, with significant effects observed at follow-up periods between 2-6 months, although evidence for ongoing benefits beyond 6-months and confirmation of these effects from more objective measures is not yet available. This systematic review also highlights the relative lack of high quality studies with long-term objective follow up of outcomes at the level of employees. As such, it is not possible at present to determine what impact, if any, manager training has on employee wellbeing.

Examination of the pooled effect sizes for manager outcomes found a smaller effect for the reduction of stigmatising attitudes towards employees with mental health problems, compared to the change in managers' supportive behaviours. This may be reflective of less stigmatising views on mental health held by managers at baseline, therefore placing a limitation on the potential for improvement on this measure. Alternatively, managers' self-reported behaviours may be reflective of a social desirability effect, biasing their responses towards more favourable reporting in the performance of certain managerial behaviours.

Previous observational studies have suggested that such behavioural changes should have positive impacts at the level of employees^{13 34} with results from a small body of research suggesting that manager training may be able to reduce psychological distress among employees^{3 16 33}. However, the pooled effect size for the limited number of studies available for the meta-analysis examining employee outcomes was unable to identify a positive flow-on effect for employees. Currently, this finding remains inconclusive due to the limited number of studies available and the short follow-up periods examining employee responses. The maximum length of follow-up for employees was 3-months. This limited follow-up period may potentially prevent managers from having an opportunity to demonstrate newly acquired skills during the allocated time frame of the research trial^{35 36} which would be dependent on an employee developing and disclosing mental health symptoms during this time. Therefore, in order to detect a true effect mental health training for managers can have for employees, larger trials with longer follow-up times may be needed, with greater focus on a subset of employees with emerging or existing mental health problems. Another explanation could be that more proximal factors within workplaces may have a greater impact on employees' mental health. For example, if a workplace is characterised by a very high level of job insecurity, having a supportive manager may not be sufficient to mitigate the mental health impacts of this environment, and will instead require the underlying factors to be addressed at the source³⁷. This type of explanation suggests that benefits of manager training may in part be dependent on different workplace contexts. Finally, it could be that changes within the organisation may have occurred during the intervention and evaluation period, impacting on the transfer of manager training³⁵. As information on organisational stability was not captured in the included studies, the impact of this remains uncertain. In spite of these concerns, the preliminary findings in this meta-analysis for employee outcomes is reflective of only an extremely small amount of available research, and in isolation should

not discourage further implementation of evidence-based and industry appropriate manager mental health training, particularly given the positive effects observed at the level of the managers.

When stratifying outcomes between studies conducted in Japan compared with Canada, UK and Australia, manager level outcomes indicate potential differences cross-culturally with regards to shifting attitudes about mental health, and changing managerial behaviour of mental health issues within the team. Again, given the number of studies in each geographical group is small, interpretation of such findings remains inconclusive and requires further studies to determine if any real differences between cultures exist.

This review has a number of important strengths, including the detailed systematic search strategy, independent rating of quality, and the steps taken to include unpublished reports. However, there are also important limitations that need to be considered. Like any systematic review, there remains a risk of publication bias. However, the use of clinical trial registry data and the large fail-safe numbers reported would suggest this was not a major limitation in this review. Our search strategy was limited to English language publications, which may have resulted in some related studies being overlooked. Additionally, manager training by its nature may be evaluated by a range of different professional groups, however, we deliberately designed our search strategy to include terms and databases that were cross-disciplinary to capture studies from a variety of industries and occupational contexts. In terms of the individual studies included in this review, the main limitations include short follow-up periods, and a shared reliance on self-reported outcomes. For employee outcomes in particular, extended monitoring and more sensitive measures may be required³⁵ in addition to the collection of objective data such as sickness absence rates³⁸. Furthermore, there is a lack of clarity and consistency regarding the content of manager training, which may have contributed to the heterogeneity observed in some of our outcome measures. This supports

the recommendation for a systematic approach to the development, implementation and evaluation of such programs³⁸. Finally, the small number of individual studies and sample sizes of some trials limits the overall power of the meta-analysis and raises the risk of type 2 errors, particularly when evaluating psychological distress among the managers' direct employees.

The range of beneficial effects of manager-specific mental health training on managers' knowledge, attitudes and behaviour found in this review are very encouraging and support such interventions as a potentially important public health initiative. While stratified analyses were unable to determine whether a particular format of training (face-to-face v online) or the type of content (awareness training v awareness plus skill development) included to date impacted differently on outcomes, interpretation regarding the equivalence of training formats or content cannot yet be made without also considering additional factors that may impact on the likely effectiveness of an intervention. These include the evidence base of the content, and the context in which the intervention is being delivered and evaluated³⁷.

However, the fact that changes were observed overall across managers' levels of literacy, attitudes and behaviour, suggest that manager mental health training should address each of these outcomes. Conclusions about observed impact on employees reporting to managers remain unclear due to the very limited availability of relevant data. This emphasises the need for additional trials evaluating a larger number of employees with longer, more detailed follow-up periods. Evaluating additional work outcomes for employees such as reasons and length of periods of absenteeism, rates of presenteeism, perceptions of the workplace psychosocial safety climate and individuals' own experience of engaging with the workplace, may provide further information about the impact manager training can have on workers reporting directly to the managers.

As the importance of workplace mental health training for managers is being widely recognised, the basis for program development and evaluation remains varied. Therefore, when deciding to implement manager training within their organisation, it is essential that employers make informed decisions based on the evidence underpinning the interventions, and the generalisability of its effectiveness to their organisational context, as disparity between available programs and their relevance to various contexts may exist. Over recent years, a number of proposed frameworks for best practice in workplace mental health have highlighted the importance of an integrated approach to manager training that prevents harm, promotes positive mental health, and addresses mental health in the workplace regardless of the cause at a primary, secondary and tertiary prevention level^{10 14}. It is hoped that these frameworks will allow future manager mental health training to be more integrated across a range of preventative and reactive employee needs, with more consistent evaluation at both the manager and employee levels, across a variety of organisational contexts, to determine the benefits for both groups.

Figure legends:

Figure 1: Flow diagram demonstrating the outcome of the systematic literature search and quality assessment

Figure 2: Meta-analysis examining the effects of intervention on manager outcomes

Figure 3: Meta-analysis examining the effects of manager training on employees' psychological distress

Contributors: AG and SBH conceptualised and designed the study. AG, JMS, and SBH developed the methodology. AG conducted the searches. AG, JMS, JN, BTB and SBH screened titles, abstracts and articles. AG, JMS, JN and SBH conducted the quality assessment. AG and JMS conducted data extraction. AG and SBH wrote the first draft of the paper. All co-authors contributed to the final manuscript.

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