

Managing Minds at Work: A Feasibility Pilot Cluster Randomised Controlled Trial of a Web-based Interactive Training for Managers to Promote Mental Health at Work

Juliet Hassard, Holly Blake, Teixeira Dulal-Arthur, Alexandra Frost, Craig Bartle, Jo Yarker, Fehmidah Munir, Benjamin Vaughan, Guy Daly, Caroline Meyer, Sean Russell, Louise Thomson

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Abstract

Background: Line managers (LM) have a key role in the primary prevention of poor mental health but need the right skills and knowledge to effectively fulfil this role. Existing interventions aimed at LMs focus on increasing their mental health awareness, rather than providing these skills. The evidence-based Managing Minds at Work (MMW) web-based training intervention was developed to address this gap and increase LM's confidence and competencies to prevent poor mental health among those they manage.

Objective: This study aimed to pilot and feasibility test the MMW intervention. The objectives were to assess: (i) the potential for uptake within small, medium, and large companies; (ii) the perceived suitability and effectiveness of the intervention; and (iii) the feasibility of the data collection methods for outcome measures.

Methods: We conducted a two-armed pilot and feasibility cluster randomised controlled trial testing a self-guided, web-based training intervention for line managers. Twenty-four organisations were randomly allocated to either the MMW intervention or a 3-month wait-list. 224 LMs were recruited and completed baseline measures (n=141 in intervention arm; n= 83 in control group) as well as 112 of their direct reports: (n= 74 intervention; n=38 control). Follow-up measures were taken at 3 and 6-months. Semi-structured interviews were carried out with LMs and stakeholders (n=20) to explore their experience of the study and intervention. Thematic analysis was used to analyse qualitative data. LMs also completed feedback forms after completing each of the five MMW modules.

Results: The recruitment of organisations and LMs exceeded targets and retention rates of LMs were good at three months (71.9%), but not at six-month follow-up (24.6%). Feedback on the intervention was very positive, indicating that line managers and organisational stakeholders found the intervention acceptable, usable, and useful. Significant improvements with large to moderate effect sizes occurred for all trial outcomes for LMs in the intervention arm from baseline to 3 months follow-up. LMs reported increased confidence in creating a mentally healthy workplace (Int M? =3.8, Cnt M? =.6), mental health knowledge (Int M? =1.9, Cnt M? =.2), psychological wellbeing (Int M? =3.6, Cnt M? =-.7), and mental health at work literacy (Int M? = 11.8,

Cnt M? =.8). Collecting data from direct reports in both study arms was challenging with results inconclusive of intervention effect. Time constraints and workload were commonly cited barriers to completion of the intervention.

Conclusions: This feasibility pilot study provides strong evidence of the usability and acceptability of MMW digital training to line managers, and acceptability of the research design and process. MMW has the potential to improve LM confidence and competencies to promote better mental health among those they manage. The study highlighted some key considerations to inform the future delivery and evaluation of MMW in a large-scale definitive trial. Clinical Trial: ClinicalTrials.gov Identifier: NCT05154019

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Original Manuscript

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Abstract

Background: Line managers (LM) have a key role in the primary prevention of poor mental health but need the right skills and knowledge to effectively fulfil this role. Existing interventions aimed at LMs focus on increasing their mental health awareness, rather than providing these skills. The evidence-based Managing Minds at Work (MMW) web-based training intervention was developed to address this gap and increase LM's confidence and competencies to prevent poor mental health among those they manage.

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Conclusions: This feasibility pilot study provides strong evidence of the usability and acceptability of MMW digital training to line managers, and acceptability of the research design and process. MMW has the potential to improve LM confidence and competencies to promote better mental health among those they manage. The study highlighted some key considerations to inform the future delivery and evaluation of MMW in a large-scale definitive trial.

Trial Registration: ClinicalTrials.gov Identifier: NCT05154019

Keywords: Cluster Randomised Control Trial, Mental Health, Feasibility, Usability, Acceptability, Workplace, Intervention

Introduction

Background

It is estimated that 15% of the global working-age population have a mental health condition [1]. This has been exacerbated by the coronavirus (COVID-19) pandemic, which led to a rise in mental ill-health among working age adults [2,3]. In the United Kingdom (UK), around 7.9% of sickness absence was due to mental health conditions [4] and more than half of all working days (approximately 17 million) were lost due to depression, anxiety, and work-related stress in 2021 – 2022 [3]. The human and economic costs of poor mental health at work are profound, impacting both employers and society-at-large [5]. It is estimated that poor mental health across the UK workforce is costing employers an estimated £51 billion per annum [6]. Despite these costs, many employers lack awareness of their responsibility to support the mental health of their employees [2], with many lacking provisions or policies to promote employee psychological wellbeing [7].

Workplace mental health interventions are typically categorised as: primary (taking action to eliminate the sources of stress or poor mental health in the workplace), secondary (detection and management of experienced stress and poor mental health by increasing awareness, knowledge, skills, and coping resources), or tertiary (minimising the effects of poor mental health at work once they have occurred through treatment of symptoms). Best practice advocates for a holistic approach integrating all three levels of intervention, targeting both workplace- and worker-directed strategies [8,9]. In particular, primary prevention is crucial to maximise employee health and productivity [8,10], and is clearly emphasised in national standards (e.g., Canada [11], Australia [12], UK [13]) and international standards (e.g., ISO 45003 [14], ILO [15], WHO [2022]) on promoting mental health at work and preventing work-related stress. The need for and use of prevention-orientated approaches is strongly emphasised across these national and international standards, with reference to the central and ongoing role played by line managers (LM) throughout this process.

The role LM's play in preventing work-related stress and promoting better mental health at work typically includes designing and managing work tasks, communicating with and managing their employees with respect and clarity, developing a supportive and psychologically safe work environment for their teams, and encouraging people to have conversations about their mental well-being at work [17-23]. However, to fulfil these

responsibilities effectively, LMs need to be equipped with the right skills, knowledge, and behavioural competencies [9,24].

Prior to the COVID-19 pandemic, approximately half of LMs had not been offered the necessary training to support them in these managerial duties and responsibilities [25,26]. Recent figures, however, indicate an upward trend of enterprises now offering mental health training for LMs as part of their wellbeing practices [27], with growing evidence of their impact on managers' behaviours and wellbeing [28] and organisational outcomes [29-31]. This underscores the need for evidence-based LM training interventions - focused on developing their knowledge, confidence, and behavioural competencies to prevent work-related stress.

Recent evidence and systematic reviews have highlighted a lack of robust evaluations of managerial or leadership training to improve employee well-being [9, 32- 34]. A limited number of LM-targeted intervention studies using trial methodology exist in the literature [35-41]. There are two notable gaps in this existing evidence base. First, only three of the key LM-targeted intervention studies included a broad prevention-oriented approach [37,38,41], only two of which were cluster randomised control trials [37,38]. Therefore, there is a need to develop and rigorously test a LM training intervention underpinned by primary prevention. Second, most existing training interventions were delivered face-to-face rather than using a digital delivery method except for three studies [37,38,41]. Digital interventions are increasingly being used within applied contexts (e.g., workplaces [42]) due to their time and resource efficient nature [43-45]. However, little is known about their usability and acceptability to LM recipients or indirect impact to those they manage (their direct reports; DR). In particular, those digital interventions targeting knowledge and behaviour change. The MMW digital training intervention seeks to address this evidence gap.

Objectives

This study aimed to pilot and test the feasibility of a future definitive cluster randomised controlled trial of the MMW digital training intervention [46]. The overarching objectives were to assess: (i) the potential for uptake within small, medium, and large companies; (ii) the perceived suitability and effectiveness of the LM training; and (iii) the feasibility of the data collection methods for primary and secondary outcome measures. The trial was pre-registered on 08/12/2021 and the protocol is published [47]. See Table 1 for an overview of the pilot trial objectives and the data sources used to investigate them.

Table 1. Overview of trial objectives and mapped data source used to explore them.

Feasibility Trial Objectives		Data Source and Data Collection Method	Criterion
1. The potential for uptake within small, medium and large companies by identifying and monitoring the:			
1.1	Willingness of employers to register interest in participating in the trial and allow LMs to take part in the trial.	End of study records used to examine the % of organisations converted from expressed interest to recruited to the study.	Minimum of eight organisations (four in each arm).
1.2	Recruitment and retention rates of LMs in the trial.	End of study records of % eligible LMs who consent and % consenting LMs who complete 3 and 6-months follow up.	70% retention rate from baseline at follow-up assessments.
1.3	Recruitment and retention of LMs' DRs	Study records of % consenting DRs who complete 3 and 6-months follow up.	50% retention rate from baseline at follow-up assessments.
2. The perceived suitability and effectiveness of the LM training by determining the:			
2.1	Acceptability, usability, and utility of the training among LM and stakeholders within the participating organisations.	Qualitative data from interview with stakeholders post-intervention and qualitative feedback provided by LM after each training module.	
2.2	Potential for improving LMs' confidence (primary outcome), knowledge, managerial behavioural competencies, and psychological well-being (secondary outcomes) to inform the planning of a larger trial.	Online survey at baseline, completion of intervention (intervention-arm only), three- and six-months after baseline using psychometrically validated measures (see measure section).	Change in mean score over time in the intervention group as compared to wait-list control arm.
2.3	Potential for improving employee outcomes (DRs' well-being, absence, productivity) and their perceptions of their LM's managerial competencies by assessing changes to inform the planning of a larger trial.	Online survey at baseline, completion of intervention (intervention-arm only), 3- and 6- months after baseline of DRs well-being, productivity, and perceptions of their LM's managerial behavioural competencies using psychometrically validated measures. Sick absence was collected through organisational records.	Change in mean score over time in the DRs managed by LMs in the intervention group as compared to DRs affiliated with the wait-list control arm
2.4	Barriers and facilitators to the intervention implementation	Qualitative data post-intervention from interview with stakeholders and	

	and effectiveness to inform the delivery of the intervention for the full trial.	qualitative feedback completed by LMs after each training module.	
3.	The data collection methods for primary and secondary outcome measures to inform key parameters for a larger trial relating to sample size and clustering.	End of study qualitative data and researcher reflections to examine the willingness to allow access to organisational-level data on sickness absence.	

LM= Line Manager; DR= Direct Report Methods

The CONSORT EHealth (Consolidated Standards Trials) guidelines were used for reporting this study [48] (see multimedia Appendix 1).

Design

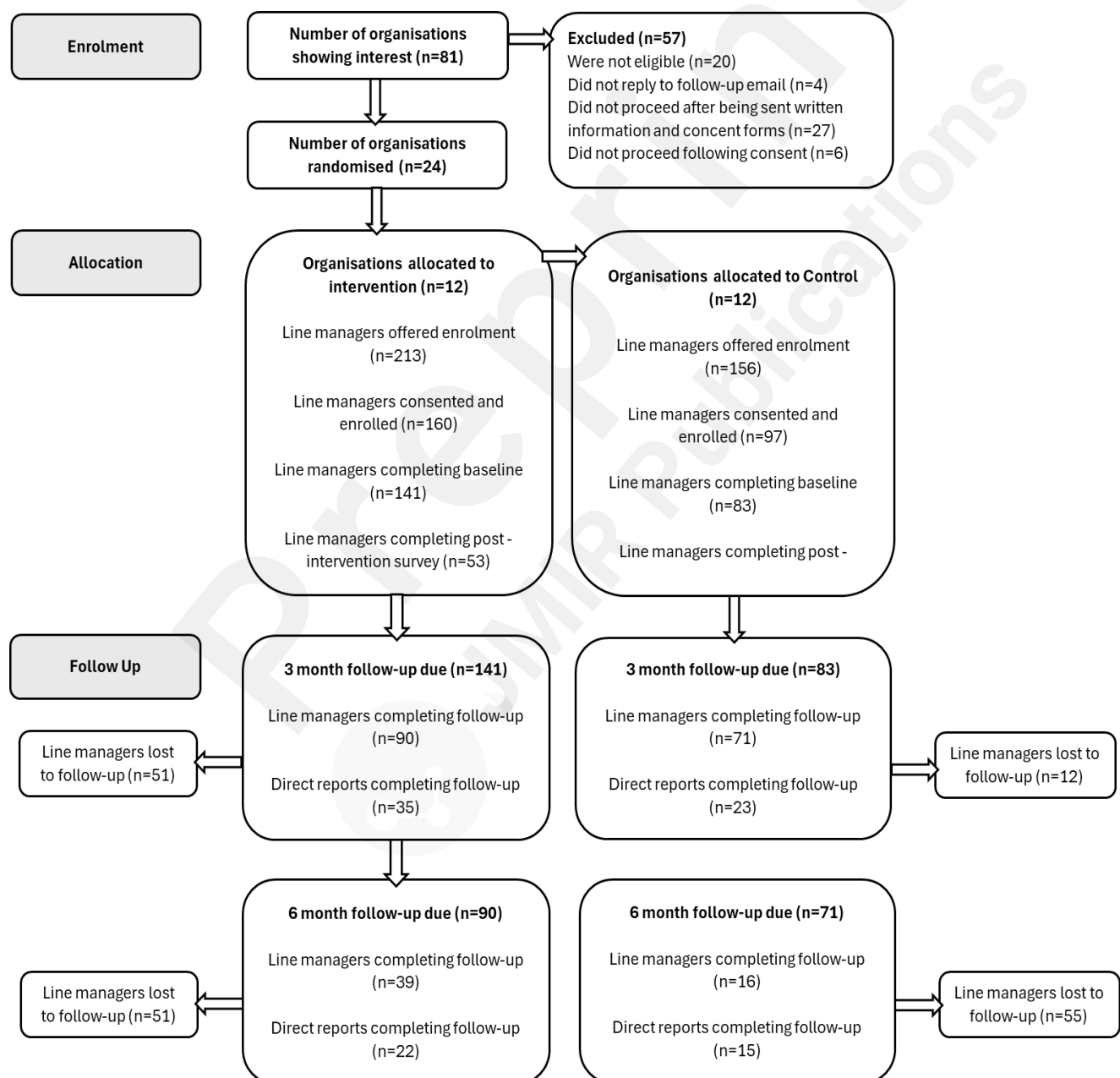
MMW was evaluated using a multi-site, two-armed pilot and feasibility cluster randomised controlled trial with embedded qualitative process evaluation in organisations of different sizes and sectors in England [47]. See Figure 1 showing the flow of participants through each stage of trial. The organisations (the clusters) were the specified units of randomisation and the LMs the participants. Follow-up assessments from baseline were completed 3- and 6-months later. Initially, a post-intervention follow-up for the intervention arm was planned, to be completed at the end of the intervention and estimated to be around 6-weeks after baseline. However, due to variation in the length of time used to complete the intervention, for many participants the 6-week post-intervention follow-up was very close to the 3-month follow-up. To prevent participant burden and maintain a standardised 3-month follow-up across both arms, the 6-week post-intervention follow-up was removed from the schedule. Those in the wait-list condition completed the 3-month follow-up assessment before gaining access to the intervention. Similarly, employees that the LMs manage (their DRs) were assessed at baseline, 3- and 6-months later. Blinding was not applied in this study for pragmatic reasons (e.g., the need to send reminder emails for intervention completion by the research team). Both the participants and organisations were aware of the condition to which they were assigned. The trial ended when the last participant had completed follow-up data collection.

Recruitment

Organisations were recruited into the study via study websites, newsletter and social media posts and formal consent from organisational representatives was obtained. LMs within each of the consenting organisations were contacted directly by the research team to invite

them to participate in the study. Inclusion criteria for LMs were that they must be aged 18 years or older, have responsibility for as a manager or supervisor, have access to a work computer or mobile phone and an email address. Exclusion criteria for LMs were if they were due to retire or be made redundant in the next 6 months or if they had completed training on mental health at work in the previous 6 months. As a feasibility pilot study, a formal sample size was not required prior to the study starting. But we aimed to recruit a minimum of 8 clusters (randomised into two groups of four) and 30 LMs per arm to inform the parameters for a possible future trial. months.

Figure 1. Participant Flow Diagram



Intervention

The intervention is reported in line with the TiDieR checklist [49] (Hoffman et al., 2014) and has been published [46]. MMW was developed using a collaborative participatory design process over a period of six months from February to July 2021 [46]. It's a self-guided, stand-alone web-based training intervention that asks recipients to work through five training modules:

1. Looking after your own mental health.
2. Designing and managing work to promote mental well-being.
3. Management competencies to prevent work-related stress.
4. Developing a psychologically safe work environment.
5. Having conversations about mental health at work.

The web application used to host the MMW digital training (Xerte software [50]) is fully automated and does not provide the user with any contact with a therapist or coach. The training was hosted using the Xerte Online Toolkits platform (Version 3.10, accessed February 2022), a free open-source tool designed for interactive content creation. Each module included written content, but also interactive (e.g., quizzes to test their knowledge) and reflective (e.g., case studies) exercises to support learning. We did not include film and audio recordings as part of the training package, due to budgetary restrictions. Module content was shaped by stakeholder feedback [46] and were designed to take 20-30 minutes to complete. Users were encouraged to complete one module per week (estimated intervention completion time: five to six weeks) and in the specified chronological order. The participating organisations agreed to allow LMs to complete this training during their working hours.

Once the baseline survey was completed, LMs in the intervention-arm were provided with a username and log-in details to the training materials by a member of the research team. LMs were asked to complete an end-of-module feedback form. These forms provided a proxy record of module completion by users, as the utilised software did allow this functionality. This form included closed (yes/no and Likert scale) items, as well open questions to explore participant's view of the module's relevance, utility, acceptability, utility, and content clarity. Its completion was voluntary.

During the intervention completion stage, the research team sent email reminders during the intervention completion phase to encourage and remind LMs to work through the modules. A reminder email was sent once every two weeks. A maximum of two reminder

emails were sent to participants.

Randomisation

The onboarded organisations were randomly assigned to either the intervention (the MMW digital training intervention) or three-month wait-list condition using an online random number generator (<https://www.random.org/sequences/>). This allocation was stratified to ensure a spread of different size of organisations within the intervention and control arms. Each organisation was allocated a number and the 50% of numbers generated were assigned to the intervention group, with the remaining 50% assigned to the wait-list.

Procedure for Data Collection

Participants provided electronic informed consent by actively selecting a checkbox on the online survey platform before proceeding to baseline assessment. Once consent had been obtained by the employing organisations, they were asked to provide a list of LMs with contact details. Once received, a member of the research team contacted the LMs directly to invite them to participate in the study. The onboarded LMs received a link to the LM baseline survey, the participant information sheet, and the consent form via their preferred email address. To maximise engagement with the MMW digital training intervention, LMs were given flexibility as to when they completed the baseline survey and started the training intervention. Therefore, 'open and closed' dates varied across organisations (opening date: 13 October 2021 to closing date: 31 March 2022). Onboarded LMs supported the study's recruitment of DRs by sending them an email with information about the study and a link to the baseline survey. These communications were drafted by the research team. However, to ensure confidentiality, the LMs were not informed DRs opted into the study. All feedback mechanisms provided DR findings aggregated across the study, not by organisation.

Both LMs and their DRs across experimental conditions were sent a follow-up survey 3-months (closed on 22 June 2022) and six-months following the completion of their baseline measure (closed on 7 October 2022) using their preferred e-mail address, as indicated on their completed consent form. In the control arm, LMs in the control arm were asked to complete the three-month measurement before they were given access to the intervention. The completed surveys were linked using the participants assigned username (e.g., managingminds1, managingminds2) for the web application. All log-in details for users were unique and were not connected to their name or work site; but rather their preferred e-mail address as provided on the consent form. Most participants chose their work-connected

email addresses. The study participants were informed about the security of the web-based applications and how their provided data would be securely stored and managed. Information provided as part of the interactive exercises on the platform was not held or stored.

Following the completion of the six-month survey, a member of the research team contacted the participating organisations to see if they were willing to share their sickness absence data for direct reports associated with LMs in the trial. LMs in the intervention-arm and organisational stakeholder in both arms were invited to take part in semi-structured interviews to gather qualitative data on their experience of the intervention and its acceptability, usability and utility. Interviews were conducted online, recorded, and transcribed verbatim.

Feasibility Outcomes

Table 1 shows the data sources and methods used to address each of the feasibility objectives (Objectives 1.1, 1.2, 1.3, 2.1, 2.4). In summary, end of study records were used to assess recruitment of organisations into the trial (objective 1.1), recruitment and retention rates for LMs (objective 1.2), and recruitment and retention of DRs (objective 1.3). The acceptability, usability and utility of the MMW web-based training intervention among LMs and stakeholders (objective 2.1) and barriers and facilitators to implementation of the intervention (objective 2.4) were assessed through qualitative interviews and online feedback forms completed at the end of each of the five MMW modules.

Primary and Secondary Outcomes

To assess objectives 2.2 and 2.3 (Table 1) we measured a series of outcomes for both LMs and DRs to examine the potential effectiveness of MMW. Improvement in LM outcomes (2.2) was assessment by measuring their confidence to foster a healthy workplace, mental health knowledge and literacy at work, psychological wellbeing and self-rated management competencies to prevent work-related stress. Improvement in DR outcomes (2.3) was assessed by measuring their psychological wellbeing, self-rated productivity, their perceptions of their LM's management practices and behaviours, and sickness absence. Confidence in managing mental health issues and promoting a mentally healthy workplace was measured using a previously published supervisor scale [51] later modified by Gayed and colleagues [52]. This is a six-item measure describing various workplace scenarios such as "creating a work environment that prevents and reduces stress within my team".

LMs were asked to rate their confidence in dealing with each of these scenarios on a 5-point Likert scale, ranging from “not at all” to “extremely confidence”. This measure has a minimum score of 6 and a maximum score of 30, with higher scores indicating increased confidence in creating a mentally healthy workplace. This measure has demonstrated good psychometric properties previously and been validated against manager behaviour [53]. The Cronbach’s alpha (α) was .84 at baseline survey.

Mental Health Knowledge Schedule (MAKS, [54]) was measured using a six-item measure rated on a Likert scale from one to six (1, “strongly disagree”; 5, “strongly agree”; 6, ‘I don’t know’). In line with scale guidance, responses of ‘I don’t know’ (6) were recoded to ‘neutral’ (3). The sixth item was reverse coded, before creating a composite score. Higher composite scores were suggestive of better mental health knowledge (scale range: 6 to 36). The six key areas explored by the scale included, include: help-seeking, recognition, support, employment, treatment, and recovery. The reliability of this scale was weak within our LM sample at baseline ($\alpha = .40$).

Workplace Mental Health Literacy [55] is a 16-item measure using vignettes tailored for the workplace context completed by LMs. This measure consists of vignettes about various mental ill-health scenarios within the workplace, with parallel questions that explore each of the four dimensions of mental health literacy. Items are ranked on a 5-point Likert scale ranging from “very low” to “very high”. A higher composite score indicates higher levels of workplace mental health literacy (scale range: 16 to 80). Previous research has found good psychometric properties for this scale [56]. Our baseline sample showed a good internal consistency for this measure ($\alpha = .90$).

Warwick-Edinburgh Mental Well-being Scale is a 14-item measure that seeks to quantify psychological wellbeing [57]. This measure was completed by both the LMs and their DRs. It asks participants to rank their psycho-emotive experience in the last two weeks across a series of statements (e.g., “I have been feeling useful”) using a 5-point Likert scale ranging from “none” to “all of the time”. Items are summed together to get a total score (minimum score 14; maximum score 70). Higher scores are indicative of better overall psychological wellbeing. Strong psychometric properties have been found for this scale using community-based samples (e.g., $\alpha = .91$ [57]; $\alpha = .93$ [58]). At baseline, within both our LMs and DRs strong internal consistency was observed ($\alpha_{LM} = .92$; $\alpha_{DR} = .90$).

Management competencies for work-related stress was measured in both the LMs and in their DRs. The Stress Management Competency Indicator Tool (SMCIT [59-61] aims to

explore the behavioural competencies of LMs surrounding the prevention and management of work-related stress. The SMCIT has two versions. One for LM to complete to rate their own competencies, and an employee (DR) version. The items mirrored in both variants, with phrasing altered to suit the target audience. For example: “When necessary, I stop additional work being taken on by my team” (manager version) and “My manager will when necessary, stop additional work being passed on to me” (employee version). The SMCIT is measured on a 5-point Likert scale ranging from 1, “strongly disagree”, to 5, “strongly agree”, and consists of 36 items (scale range: 36 to 180). This measure explores four key competency areas: “Managing Emotions and Having Integrity”; “Managing and Communicating Existing and Future Work”; “Managing the Individual Within the Team”; and “Reasoning and Managing Difficult Situations”. Items in each subscale are summed to create a composite score for each sub-competency, with higher scores indicating better management competencies. Previous research found satisfactory internal consistency ($>.7$) for both LMs [62] and employees [63]. All our Cronbach’s alphas were $>.7$ in both our LM and DR groups.

DRs were asked to complete a single item on their self-reported productivity: “To what degree do you agree with the following statement? In the past week, I have been working under my average productivity.” Anchored using a 5-point Likert scale ranging from “not at all” to “completely”. Lower scores represent better self-rated productivity by DRs.

Analytical Methods

SPSS version 28 [64] was used to conduct statistical analysis with collected quantitative data to address objective 2.2 and 2.3. The significance level was set at $P<.05$. Missing data were inspected before data analysis to ensure that it was missing completely at random, and individual cases did not have an excess of 5% missing data [65]. Where missing data were identified and observed to be missing completely and not more than 5% per case, an imputation method was applied.

Descriptive statistics were calculated for each outcome measure with 95% confidence intervals. Mean values were calculated at the participant (grand-mean; for LM and DR data) and organisational-level (for LM data only; group-mean). As this is a pilot study, we did not employ multi-level modelling. However, the interclass correlation (ICC-1) was calculated to examine the variability between clusters (organisations) to inform a future trial on the influence of these clusters on observed treatment effects.

We quantified, and tested, change overtime across our experiential conditions, creating a new study variable for each (LM and DR) outcome measure. This new variable was calculated by subtracting the participant's mean score at three-month follow-up from their baseline measure. We did not use the six-month follow-up measure to compare between intervention and control groups, as our wait-list control group had gained access to MMW at this point.

An independent *t* test was used to test for significant group differences between the intervention and control arms. Bootstrapping (BCa with 5000 iterations) was employed to adjust for deviations from multivariate normality and to yield 95% confidence intervals (CI) [66]. Both P-values ($<.05$) and CIs (not crossing zero) were inspected to assess statistical significance. We calculated the effect size for each comparative analysis using Cohen's *d* (with 95% CIs; Cohen, 1988). Drawing on Cohen's interpretive guidelines to support interpretation: small effect, $d \geq .2$; medium effect, $d = .5$ to $\leq .8$; large effect, $d > .8$ [67].

The data provided through the end-of-module feedback forms were analysed descriptively to summarise participant's view of the module's relevance, utility, acceptability, utility, and content clarity. Thematic analysis [68] was used to analyse the qualitative data derived by the qualitative interviews. The detailed analytical methods and results of the qualitative analysis for trial objective 2.4 will be written up and published separately.

Results

Ours results are presented below by trial objective.

Trial Objective 1: Potential Uptake and Interest to Participate in the Study by Employers, LMs and DRs

Objective 1.1: Willingness of employers to register interest and participate in the study.

We successfully recruited beyond our *a priori* specified sample size for participating organisations (N=8) within six months. Recruitment was open from 20 August 2021 and 27 January 2022. In total, 81 organisations expressed an interest in taking part in the MMW trial. Of these, 30 completed the organisational consent form and 24 (29.6%) proceeded to fully enrol on the feasibility trial. Of the 57 organisations who did not take part, 20 (35.1%) were ineligible, four (7%) did not reply to the follow-up e-mail, 27 (47.4%) did not proceed after being sent written information and consent forms, and six (10.5%) did not proceed

following consent.

Objective 1.2: Recruitment and Retention of LMs

The recruitment of LMs from within the consented and participating organisations occurred over nine months. A total of 369 LMs were emailed information offering them enrolment in the MMW study. Of these, 257 consented and enrolled on the study (69.6%), with 87.2% ($n=224$; $n_{\text{intervention-arm}}=141$; $n_{\text{control-arm}}=83$) completing the baseline survey. The majority of LMs recruited for the study were female (64.7%, $n = 145$), with an average age of 44.7 years ($SD = 8.3$, $n = 224$). On average, LMs had 10.7 years of management experience ($SD = 7.4$), ranging from less than one year to 30 years. See Table 1 for baseline demographics by experimental condition.

At three months, 161 LMs (71.9% of those who completed the baseline survey) completed the follow-up assessment at this time point: intervention arm, $n=90$; wait-list control arm, $n=71$. At six months, 55 (24.6% of those who completed the baseline survey) completed the follow-up assessment at this time point: intervention arm, $n=39$; wait-list control arm, $n=16$. Our LM retention rates surpassed our *a priori* specified criteria of 70% at three months, but not the 50% retention at six-month follow-up.

Table 1. Baseline LM demographics by experimental condition

		Intervention arm ($n=141$)	Control (wait-list) arm ($n=85$)
Age	Mean (95% CI) SD (SE), range valid n.	44.6 (43.3 to 45.8) 7.6 (.6), 26 to 61 $n=141$	44.4 (42.5 to 46.2) 8.6 (.9), 30 to 69 $n=84$
Gender	Female Male	$n=90$ (63.8%) $n=51$ (36.2%)	$n=55$ (66.3%) $n=28$ (33.7%)
Tenure managing people	Mean (95% CI) SD (SE), range valid n.	10.0 (8.9 to 11.2) 6.7 (.6), 0 to 30 $n=141$	12.2 (10.4 to 14.0) 8.4 (.9), 0 to 30 $n=85$

Objective 1.3. Recruitment and Retention of LM's direct reports (DR).

The recruitment of DRs occurred over seven months. Due to expected variations in the number of DRs per LM, we did not set *a priori* targets for the number of DRs to be recruited. Furthermore, we are not aware of how many DRs were approached by their LMs to participate and, therefore, cannot calculate the percentage recruited to the study. A total of

112 completed the baseline survey: intervention arm, n=74; wait-list control arm, n=38. At baseline, 80.7% of DR were female (n=88), with an average age of 41.4 years (SD = 10.29) and a mean tenure of 7.8 years (SD = 7.9) in the organisation. At three months, 58 (50% of those who completed the baseline survey) DRs completed the three-month follow-up assessment: intervention arm, n=35; wait-list control arm, n=23. At six-months, 37 DRs completed the follow-up assessment (31.9% of those who completed the baseline survey): intervention arm, n=22; wait-list control arm, n=15.

Table 2. Baseline DR demographics by experimental condition

		Intervention arm (n=74)	Control (wait-list) arm (n=38)
Age	Mean (95% CI) SD (SE), range valid n.	42.7 (40.5 to 44.9) 9.92 (1.2) n = 74	38.95 (35.6 to 42.3) 10.66 (1.63) n = 38
Gender	Female Male Prefer not to say	n = 58 (81.7%) n = 13 (18.3%)	n = 30 (78.9%) n = 7 (18.4%) n = 1 (2.6%)
Tenure	Mean (95% CI) SD (SE), range valid n.	8.95 (6.9 to 10.9) 8.59 (1.0) n = 74	5.67 (3.9 to 7.7) 6 (1.0) n = 38

Trial Objective 2: The perceived suitability and potential effectiveness of the LM training.

Objective 2.1: Acceptability, usability, and utility of MMW digital training intervention.

Qualitative data from interviews with LMs and stakeholders' post-intervention and qualitative feedback provided by LM after each training module were used to assess the acceptability, usability, and utility of the MMW Digital training intervention. 20 interviews were conducted (LM, n=16; organisational gatekeepers, n=4). Feedback forms were completed by over 100 LMs after each module (n=104-169, across the 5 modules) and descriptive data are presented in Table 3.

Table 3. Descriptive Data from Module Feedback Forms Completed by LMs in intervention arm and wait-list control

		Feedback on Each Modules				
		% (n)				
		1 Self-Care for LMs (n=169)	2 Designing Work to Prevent Stress (n=145)	3 Management Competencies (n=112)	4 Conversations on Mental Health (n=112)	5 Psychological Safety at Work (n=104)
Was the module relevant to your managerial role?	Yes	97.6 (160)	99.3 (139)	99.1 (110)	100 (110)	100.0 (101)
	No	2.4 (4)	0.7 (1)	0.9 (1)	0.0 (0)	0.0 (0)
Did you learn anything that you did not know before?	Yes	50.6 (84)	82.4 (117)	69.1 (76)	73.9 (82)	92.0 (92)
	No	49.4 (82)	17.6 (25)	30.9 (34)	26.1 (29)	8.0 (8)
It was easy to find the time to complete the module	Strongly Agree/Agree	63.2 (105)	52.5 (73)	54.5 (61)	55.4 (61)	63.3 (64)
	Neither Agree/Disagree	16.3 (27)	20.1 (28)	17.9 (20)	18.2 (20)	15.8 (16)
	Strongly Disagree/Disagree	20.5 (34)	27.4 (38)	27.7 (31)	26.3 (29)	20.8 (21)
The module was an appropriate length for the information provided.	Strongly Agree/Agree	95.7 (159)	97.9 (136)	95.5 (117)	95.5 (105)	97.1 (98)
	Neither Agree/Disagree	1.2 (2)	0.7 (1)	2.7 (3)	4.5 (5)	3.0 (3)
	Strongly Disagree/Disagree	2.4 (4)	1.4 (2)	1.8 (2)	0.0 (0)	0.0 (0)
The online module was easy to navigate	Strongly Agree/Agree	96.3 (158)	90.6 (126)	97.3 (109)	92.8 (103)	97.0 (97)
	Neither Agree/Disagree	1.2 (2)	4.3 (6)	1.8 (2)	6.3 (7)	2.0 (2)
	Strongly Disagree/Disagree	2.4 (4)	5.0 (7)	0.9 (1)	0.9 (1)	1.0 (1)
I found some of the information presented difficult to understand	Strongly Agree/Agree	8.4 (14)	5.7 (8)	7.2 (8)	7.2 (8)	9.9 (10)
	Neither Agree/Disagree	1.8 (3)	2.2 (3)	3.6 (4)	2.7 (3)	2.0 (2)
	Strongly Disagree/Disagree	89.8 (149)	92.1 (128)	89.3 (100)	90 (100)	88.1 (89)
The examples provided were not relevant to my role as a manager	Strongly Agree/Agree	11.4 (19)	13.0 (18)	14.3 (16)	13.5 (15)	9.9 (10)
	Neither Agree/Disagree	10.8 (18)	10.1 (14)	8.9 (10)	7.2 (8)	4.0 (4)
	Strongly Disagree/Disagree	77.7 (129)	77.0 (107)	76.8 (86)	79.2 (88)	86.1 (87)

In general, reactions were very positive and suggest that the intervention was perceived by both LM and stakeholder as acceptable, usable, and useful. LMs felt that the modules were relevant to their managerial roles (97.6% to 100% agreement across the five modules) and they learned new information from the content, especially from modules 'Psychological Safety at Work' (92% agreement) and 'Designing Work to Prevent Stress' (82.4% agreement). Qualitative comments on the feedback forms supported these findings, for example: *"... this course has been excellent. I like to think that I am a good leader anyway, but this is giving me lots of ideas about how to be an even better one. Thank you!"*.

There were high levels of agreement about the length of each module being appropriate (ranging from 95.5% to 97.9% agreement) and that the content was easy to navigate (ranging from 90.6% to 97.3% agreement). Interview participants liked the flexibility in the way it was delivered and highlighted specific aspects that were particularly beneficial, for example, its ease of use and relevance to not only their team's mental health but their own self-care and mental health too. Qualitative feedback collected from the module feedback forms echoed the sentiments expressed in the stakeholder interviews, confirming the acceptability, usability, and utility of the MMW Digital training intervention. For example, one participant said *"I have learnt how to recognise signs of concerns for the mental wellbeing of my team and also friends and family outside of the workplace. It also allowed me to self-reflect on my own mental wellbeing. I now have many resources that I downloaded from this course and links to other websites for extended reading."* The convergence between these two data sources strengthens the validity of the findings, affirming the positive reception of the intervention by both employing organisations and LMs.

Objective 2.2. Improvement in LM outcomes

Table 4 provides a descriptive overview of the observed means (both participant-and cluster-level), standard deviations and calculated ICC(1) across the specified outcomes over the time series for LMs.

Table 4. Mean (standard deviation) across trial outcomes by participant (P) and cluster (c) levels and by intervention (Int) and control (Cnt) arms across the time series, and inter-class correlation (ICC) (between clusters) at baseline.

Variable (α)	Group		Baseline		3-months		6-months		ICC (1)
			M (SD)	n	M (SD)	n	M (SD)	n	
Confidence to create a mentally healthy workplace (.84)	Int	P	20.7 (3.9)	14	24.1 (3.1)	86	24.7 (3.0)	39	.07
		C	20.8 (1.6)		24.4 (1.3)		24.8 (1.0)		
	Cnt	P	20.4 (3.6)	85	20.7 (3.9)	73	24.9 (2.5)	16	
		C	20.3 (1.5)		20.7 (2.3)		24.0 (2.1)		
Mental health knowledge (.51)	Int	P	23.4 (2.9)	14	25.2 (2.9)	86	24.7 (2.2)	38	.00
		C	23.4 (.9)	1	25.1 (.8)		24.8 (1.9)		
	Cnt	P	22.8 (2.9)	85	23.0 (3.0)	73	22.9 (4.6)	16	
		C	22.8 (.7)		23.0 (1.1)		22.4 (1.9)		
Psychological wellbeing (.92)	Int	P	47.9 (8.1)	14	52.1 (7.1)	85	52.2 (8.8)	38	.00
		C	48.0 (2.9)		52.0 (2.5)		52.2 (4.1)		
	Cnt	P	49.7 (7.8)	84	48.6 (8.6)	72	54.1 (8.3)	16	
		C	49.5 (3.0)		48.8 (3.7)		54.2 (6.5)		
Mental health at work literacy (.94)	Int	P	48.7 (9.1)	14	61.5 (7.2)	86	63.0 (7.6)	38	.13
		C	48.79 (4.15)		61.37 (2.68)		63.00 (3.47)		
	Cnt	P	47.7	83	49.0	72	61.9	16	

			(8.8)		(8.9)		(5.3)		
		C	47.6 (3.8)		49.1 (4.4)		61.9 (4.6)		
SMCIT ¹ : Respectful and responsible: managing emotions and having integrity (.68)	Int	P	69.7 (5.3)	14 0	72.4 (5.6)	86	74.2 (4.7)	39	.00
		C	69.7 (1.7)		72.4 (2.6)		74.3 (2.2)		
	Cnt	P	69.3 (5.1)	84	68.8 (5.6)	72	72.6 (7.8)	16	
		C	69.3 (2.5)		68.8 (3.0)		71.0 (5.1)		
SMCIT ¹ : Managing and communicating existing and future work (.87)	Int	P	87.9 (7.1)	14 0	93.7 (8.2)	86	96.2 (7.6)	39	.05
		C	87.9 (2.7)		93.6 (2.9)		96.2 (2.4)		
	Cnt	P	87.6 (8.4)	83	87.1 (8.2)	70	92.3 (9.9)	16	
		C	79.0 (3.7)		87.2 (3.9)		92.3 (7.0)		
SMCIT ¹ : Managing the individual within the team (.84)	Int	P	61.6 (5.9)	14 1	65.2 (5.7)	85	65.8 (5.9)	37	0.0
		C	61.6 (2.0)		65.1 (2.8)		65.8 (2.1)		
	Cnt	P	61.9 (5.9)	84	60.5 (5.7)	72	63.3 (6.5)	16	
		C	61.9 (2.1)		60.7 (2.9)		63.3 (5.1)		
SMCIT ¹ : Reasoning/ managing difficult situations (.79)	Int	P	46.6 (4.9)	14 2	50.2 (5.1)	86	51.7 (4.7)	38	.07
		C	46.6 (1.9)		50.1 (1.9)		51.7 (2.1)		
	Cnt	P	46.2 (5.4)	84	46.2 (5.4)	73	50.6 (4.5)	16	
		C	46.1 (2.2)		46.3 (2.9)		50.6 (3.0)		

¹ Stress Management Competency Indicator Tool [59]

Given the clustered nature of our data, we calculated the ICC (1) to examine the need for multilevel modelling. If the ICC (1) is very small and the importance of using a multi-level approach is thought to diminish, since there is less evidence of clustering of group scores. Opinions on what is deemed a small range varies from 5 to 12% [69,70]. We observe across our outcome measures relatively small percentage attributed to variance at the cluster-level (organisations), ranging from 0 to 13%. Therefore, we conclude that the need to account for clustering is somewhat minimal, with perhaps the exception of mental health at work literacy which demonstrates a slightly higher ICC (1). We observed significant changes in our intervention group, as compared to the control group, from baseline to three month follow up across all our specified outcome measures (Table 5). In particular, we observed that LMs that completed MMW reported increased confidence to create a psychologically healthy workplace, better mental health knowledge, psychological well-being and mental health literacy at work, and improved managerial competencies surrounding the prevention and management of work related stress (respectful and responsible, managing and communicating existing and future work, managing the individual within the team, and reasoning/ managing difficult situations). Cohen's d was used to estimate the magnitude of this change over time as compared to the control group drawing Cohen's [67] interpretation benchmarks: small, $d = 0.2$; medium, $d = 0.5$; and large, $d = 0.8$. A moderate size change in the intervention group, as compared to the control group, was observed in relation to their self-reported psychological well-being ($d=.5$) and their management competency on being respectful and responsible ($d=.7$). A large effect size was observed across the remaining outcome measures examined in this feasibility study, ranging from .85 (management competency, reasoning and managing difficult situations) to 3.1 (mental health knowledge). However, the reliability for the mental health knowledge scale was weak and, therefore, this observation should be interpreted with a certain amount of caution. No significant adverse events were observed or reported among LMs during the study.

Table 5. Results of independent T tests comparing observed change over time (computed: 3-month follow-up – baseline) across trial outcome variables for LMs.

Outcome	Mean change- Intervention group			Mean change -Control Group			T-test	Mean differenc e (95% CI BCa)	Cohen's d (95% CI BCa)
	MΔ	SD	N	MΔ	SD	N			
Confidence to create a psychologically healthy workplace	3.8	3.2	86	.6	3.2	73	$t(157) = 6.4, P < .001$	.3 (2.2, 4.3)	1.0 (.7, 1.4)
Mental health knowledge	1.9	3.0	85	.2	2.9	73	$t(156) = 19.6, P < .001$	1.7 (.8, 2.6)	3.1 (2.7, 3.6)
Psychological wellbeing	3.6	8.3	84	-.7	7.7	71	$t(153) = 3.3, P = .003$	4.30 (1.9, 6.8)	.53 (.2, .9)
Mental health at work literacy	11.8	8.9	84	.8	6.2	69	$t(147.5)^1 = 9.0, P < .001^1$	11.1 (8.6, 13.4)	1.4 (1.1, 1.8)
SMCIT: Respectful and Responsible	2.9	5.5	84	-.4	3.9	70	$t(149.1)^1 = 4.4, P < .001$	3.3 (1.9, 4.9)	.7 (.4, 1.0)
SMCIT: Managing and communication existing and future work	5.5	6.9	86	-.6	5.8	68	$t(152) = 5.8, P < .001$	6.1 (4.1, 8.2)	.95 (.6, 1.3)
SMCIT: Managing the individual within the team	3.1	5.1	84	-1.4	4.2	72	$t(154) = 5.9, P < .001$	4.46 (3.0, 6.0)	.9 (.6, 1.3)
SMCIT: Reasoning/managing difficult situations	3.5	4.4	86	-.3	4.7	55	$t(155) = 5.3, P < .001$	3.8 (2.4, 5.3)	.85 (.2, 1.2)

¹ significant Levene's test, unequal variances reported.

Objective 2.3. Improvement in DR outcomes

Table 6 provides a descriptive overview of the mean scores observed for DRs within the intervention and control arms over the time series data collection.

Table 6. Mean, Standard deviation for the intervention (Int) and control (Cnt) DR across time series

Direct report: Trial outcomes	Group	Baseline		3-months		6-months	
		M (SD)	n	M (SD)	n	M (SD)	n
Self-reported productivity (higher score poorer productivity)	Int	1.8 (1.0)	74	1.6 (1.0)	45	1.8 (.9)	23
	Cnt	1.7 (1.0)	38	2.3 (1.3)	24	2.1 (1.3)	14
Psychological wellbeing (lower score, poorer wellbeing)	Int	46.1 (7.9)	74	47.3 (9.0)	45	47.3 (8.5)	23
	Cnt	47.0 (7.3)	38	47.1 (6.7)	24	41.5 (7.6)	14
SMCIT: respectful and responsible	Int	28.3 (2.5)	74	28.2 (2.8)	45	28.5 (2.7)	23
	Cnt	29.2 (2.4)	38	29.3 (3.0)	24	28.4 (2.5)	14
SMCIT: managing and communicating existing and future work	Int	33.0 (4.1)	74	33.4 (3.8)	45	33.2 (4.5)	23
	Cnt	32.8 (4.9)	38	31.2 (5.9)	24	31.3 (7.3)	14
SMCIT: managing the individual within the team	Int	13.0 (1.5)	74	12.9 (1.8)	45	12.9 (2.1)	23
	Cnt	12.4 (2.3)	38	11.8 (2.9)	24	11.9 (2.2)	14
SMCIT: reasoning/ managing difficult situations	Int	33.7 (5.1)	74	44.0 (5.5)	45	35.4 (5.8)	23
	Cnt	33.4 (5.5)	38	32.6 (6.1)	24	33.6 (6.7)	14

Due to the research design, we were not able to delineate which DR derived from which LMs or participating organisations. Therefore, it is not possible to provide a mean at the cluster-level. We did not observe a statistically significant change in the psychological well-being of DR over time in our intervention, as compared to our control group (Table 7).

Table 7. Results of independent T tests comparing observed change over time (computed: 3-month follow-up – baseline) across trial outcome variables for DR

Outcome	Mean change- Intervention group			Mean change - Control Group			T-test	Mean difference (95% CI BCa)	Cohen's d (95% CI BCa)
	MΔ	SD	N	MΔ	SD	N			
Self-rated productivity	-.2	1.3	45	.5	1.4	24	t (67) = -2.2, P=.02	-0.7 (-1.4 to -.1)	-.6 (-1.1 to -.1)
Psychological wellbeing	1.1	6.8	45	1.0	5.5	24	t (67) = .1, P=.947	0.1 (-2.9 to 3.2)	.01 (-.5 to .5)
SMCIT: Respectful and Responsible	-.1	3.1	45	.1	3.3	24	t (67) = .0, P=.49	.0 (-1.4 to 1.6)	.1 (-.5 to .5)
SMCIT: Managing and communication existing and future work	.2	3.4	45	-.5	2.7	24	t (67) = 1.0, P=.16	.8 (-.7 to 2.1)	.3 (-.3 to .8)
SMCIT: Managing the individual within the team	-.1	1.5	45	-.2	1.6	24	t (67) = .1, P=.45	.1 (-.7 to .9)	.0 (-.5 to .5)
SMCIT: Reasoning/managing difficult situations	.4	4.0	45	.2	4.8	24	t (67) = .2, P=.43	.2 (-2.1 to 2.5)	.0 (-.5 to .5)

However, the DRs of managers who received the intervention did show overall, yet non-significant, improvements in their psychological wellbeing and in their perceptions of their LMs' competencies in managing and communicating existing and future work, managing the individual within the team and managing difficult situations. We did observe a statistically significant change in self-rated productivity; however, this was not in the anticipated direction, with improved self-rated productivity in the control, rather intervention, group overtime. Across the four management competencies, as observed

and reported by DR, we did not observe a statistically significant change overtime in comparison to the two experimental conditions.

Following the completion of the intervention, we contacted the participating organisations to see if we could obtain organisational level sickness absence records. Unfortunately, we were not able to secure access to this data, questioning the feasibility of accessing this type of data in this way within a future trial and identifying the need to have clearer data sharing protocols set up in advance. No significant adverse events were observed or reported among DR during the study.

Objective 2.4: Barriers and Facilitators to Implementation

Qualitative methods were used to explore the barriers and facilitators to intervention implementation and effectiveness to inform the delivery of the intervention for a full trial. Data showed that a commonly perceived barrier to the intervention implementation was time constraints and perceived workload. Module feedback forms (Table 3) highlighted that between a fifth and a quarter of LMs disagreed with the statement that it was easy to find time to complete the modules (ranging from 20.5% to 27.7% across the five modules).

Qualitative comments on the feedback forms also showed that LMs were struggling to fit the training into their workday, for example "*Finding time to do them difficult, so its late and I'm tired*". In interviews, some LMs also described that their completion of the training was hampered by a lack of ability to commit time to engaging with MMW due to their existing workload. Although a suggested weekly schedule was provided, workload demands meant that for many participants this was not followed, which may have lessened their learning, for example: "*The biggest challenge was finding the time to do it... I actually ended up squashing them all together at the end, which is inevitable. And actually I don't think that's as good for learning as it would have been if I spent done a little bit each week.*"

The main facilitators to completing and accessing the MMW modules focused on the flexibility offered by the self-led learning process and the support for learning by senior managers. Interview participants described the benefits of the structure of five discrete

modules which could be completed at a convenient time but with a suggested schedule of one module per week. This gave them the flexibility to complete the modules at a time of their choice, for example: *"It absolutely does work in terms of it being self-led so that you know got quite a lot of time to complete that training and they can stretch it around their other commitments"*. Encouragement and support from senior managers within the organisation also facilitated completion of the training and were key to overcoming some of the barriers relating to time constraints. However, stakeholders also said that integrating the training into their other existing activities and adding on other activities led by the organisation would have allowed even more encouragement and reflection. For example, *"[It] needed more integration, but that is any learning intervention that you take... I probably should have said use module 4 as a kick start and then probably taken that into some practical role plays. I could easily have run. Use that as the base. Take that forward to try and get confidence up in the conversations"*.

Trial Objective 3: Feasibility of data collection methods

The Mental Health Knowledge Schedule [54] demonstrated poor levels of reliability within our feasibility study. We conclude, therefore, that this measure should not be utilised in a full trial context. The remainder of our measures used to quantify primary and secondary outcomes demonstrated satisfactory psychometric properties. Attempts to collect sickness absence data from organisations was particularly challenging and, therefore, its utility as a data collection method is limited. Therefore, alternative data collection methods may be required to quantify changes in sickness absence behaviours in a future trial. This may include using self-report data from the perspective of DR. We included a sufficient number of organisations from a clustering perspective, however, the number of LMs within each respective cluster varied considerably. Therefore, to statistically account for any clustering effects, a full trial will need to consider and achieve both quantity in terms of clusters as well as variability regarding individuals within each cluster that are retained over the time series. DR were challenging to recruit and retain within the study so consideration to alternative methods of recruitment will be considered in future trials.

Discussion

This feasibility pilot trial aimed to pilot the MMW digital training intervention and assess its acceptability and potential for improving LM and DR outcomes as well as the feasibility for a future trial. The objectives were to assess: (1) the potential for uptake within small, medium and large companies; (2) the perceived suitability and potential effectiveness of the LM training; and (3) the feasibility of the data collection methods for primary and secondary outcome measures.

Principle findings

In relation to objective 1, recruitment of organisations into the trial was very successful, indicating a demand for this type of intervention. The recruitment and retention of LMs was also positive and surpassed outlined criteria at three-months. However, the recruitment and, in turn, retention, of DRs was considerably more challenging, highlighting the need to review and amend both our recruitment methods and retention efforts among DRs in a future trial.

In relation to objective 2, feedback through end-of-module forms and interviews revealed that the intervention was deemed highly acceptable, useable, and useful by organisations and LMs. The MMW intervention also demonstrated potential for improving LMs' outcomes, with significant changes observed in our intervention group as compared to our control group of LMs across all our outcome measures. LMs who completed the MMW digital training intervention benefited from increased mental health knowledge, mental health literacy at work, confidence to foster a psychologically healthy workplace, as well as improvements in their own psychological well-being and management competences to prevent work related stress. Furthermore, the magnitude of these changes was moderate to large in nature. These findings highlight the potential impact of this digital training interventions to LMs directly. However, the indirect impact of this digital interventions on DRs was not observed. This may be a result of experienced challenges in both recruitment and retention but may also be a limitation of a shorter follow up period of three months. It may be that the indirect value of this

training initiative may take longer to exhibit within DR, as opposed to LMs participating in the intervention directly.

Qualitative data showed that perceived barriers to engagement with the intervention were time constraints and perceived workload. LMs proposed that uptake in participants was hampered by a lack of ability to commit time to engaging with MMW due to their existing workload. We will build on the findings from this aspect of the study and phase two were to explore how the intervention could be implemented more efficiently alongside other organisational practices and policies and to maximise the support of senior managers, which appears to have an important role facilitating the completion learning from MMW.

This feasibility pilot study provides preliminary evidence of the usability and acceptability of MMW digital training to LMs, its potential to improve outcomes and the feasibility of the research design and process. The study highlighted some key considerations to inform the future delivery and evaluation of MMW in a large-scale trial.

Results in Context with other research

These promising results for the MWW digital training intervention offer significant value, particularly when contextualised within the broader landscape of workplace mental health and management practices. LM training has been identified as a key target for intervention [9,15,16] yet few robust evaluations of interventions have been conducted [9,32-24]. Therefore, this study contributes to the growing body of evidence that organisations and LMs are keen to engage with interventions to improve skills and competencies for preventing poor mental wellbeing at work and that change in these critical areas can occur.

The success in recruiting beyond the specified sample size is an encouraging indicator of employer willingness to engage in mental health interventions. The need for such interventions is emphasised by statistics showing that one in six workers experience mental health issues annually in the UK [3] and by policy standards and guidance [8,9], which highlight the importance of a comprehensive approach to workplace mental health interventions. Specifically, those which incorporate primary, secondary and tertiary strategies. This success does, however, contrast with other studies which face

challenges in recruiting organisations for workplace interventions due to issues such as perceived burden of study [71], further stressing the growing recognition of the importance of mental health in the workplace. Although the retention rates of LMs surpassed the criterion at three months, it did not at six months, indicating a common methodological challenge of maintaining engagement overtime in longitudinal studies [72]. Despite our efforts to minimise attrition, the decline in retention rates suggests that other areas of methodological refinement are needed to maximise participant retention. Research suggests that awareness of an intervention's efficacy does not necessarily indicate that the participants will accept the intervention. As such, it is important to capture perceived acceptability of such interventions [73]. The favourable reception to the MMW digital training intervention regarding acceptability, usability, and utility underscores the need to involve end-users in the development and refinement of health interventions. The finding also aligns with the growing body of research that supports digital mental health interventions in the workplace [74-76].

LMs who received the MMW training exhibited improvements in several outcomes, relative to those who did not receive training, including confidence to create a psychologically healthy workplace, understanding of mental health issues, psychological wellbeing, mental health literacy at work and managerial behavioural competencies. Studies exploring such interventions have similar findings [33,77,78]. The convergence of evidence emphasises the importance of equipping managers with mental health knowledge and management competencies surrounding stress prevention through interventions like MMW can improve the overall mental health and wellbeing of the workplace.

The perceived barriers of time constraints and workload impacting the uptake of workplace interventions is often observed across studies focusing on workplace wellness programmes [79] and health promotion in general [80]. This is particularly significant in the context of mental health interventions as the need for such programmes is often greatest in high stress environments. There is consequently a need for organisational strategies that address these structural barriers to participant engagement. This aligns with other findings on the implementation of workplace mental well-being interventions which have identified the importance of senior management

support, time allocation for training and continuity of efforts to implement interventions [81,82].

Strengths, Limitations and Future Directions

A review of UK-based pilot and feasibility studies registered on ISRCTN from 2013 to 2020 found that the median target sample size was 33 per arm but 57% of studies did not reach this sample size target [83]. In comparison, this study reached a samples size of 90 (intervention) and 71 (control) at the 3-month follow-up point where comparison between arms was possible. Comparison with the LM sample sizes from full cluster RCTs of similar interventions indicate that these have frequently been smaller at the first available follow-up than the current feasibility pilot trial e.g. n=62 intervention, n=64 control at 3-month follow-up [38]; n=41 intervention, n=78 control at 4-month follow-up [37]; n=25 intervention, n=19 control at 6-months follow-up [40]; n=88 intervention, n=54 control at 8-weeks follow-up [36]; n=24 intervention, n=13 control at 12-week follow-up [35]. Our study was a feasibility pilot to enable us to test whether the components of the study would work (recruitment, randomisation, intervention acceptability, follow-up) [84] but also to assess whether the MMW has the potential to be improve outcomes [85] which we can conclude with some confidence for LM outcomes given the sample sizes and effect sizes observed. However, to assess the effectiveness and cost-effectiveness of the intervention a full trial would be needed, informed by the findings of this pilot feasibility trial. One of the strengths of this study is the moderate to large effect sizes for changes in LM knowledge, skills and competencies found from a large sample across 24 organisations.

Although the DRs of managers who received the intervention showed slight improvements in psychological wellbeing and perceptions of their managers' competencies, these improvements were not statistically significant. Future research will need to test whether the LM changes observed can be cascaded to DR outcome improvements within the time frame of the study. Future research will need to extend the follow-up timescales to allow this, as well as develop a more effective recruitment and retention strategy for DRs. In the context of this study, we recruited DRs through their LMs disseminating study information to them directly. This recruitment approach

may have acted as a barrier to DR participation in the study, due to potential concerns regarding their anonymity within the context of the study given they will be reporting on their LMs behaviours and competencies. We will review and amend both our recruitment methods and retention efforts among DRs in any future trial. A future trial may seek to recruit DR directly by a member of the research team either remotely or through workplace site visits.

The current study did not use proactive retention efforts to retain DRs into the study, only LMs. A future study should consider retention efforts and activities directed at both LMs and their DRs both independently and concurrently to support retention efforts. As a feasibility trial, we have identified a number of limitations to our original research design which are noted above. These focus on the low recruitment of DRs and the challenges accessing organisational records for sickness absence. Additional limitations identified include to the mental health knowledge scale showing poor levels of reliability and conclude that this measure should not be included in a full trial. Previous research has observed mixed findings in relation to the psychometric strength of this scale [54,86]. All other measures used to quantify primary and secondary outcomes demonstrated satisfactory psychometric properties. Attempts to collect sickness absence data from organisations was particularly challenging and, therefore, its utility as a data collection method is limited.

The majority of LMs that opted into our study were female, and due to the voluntary nature of the intervention, and may already be interested/ invested in the importance of mental health at work. Therefore, a future trial should actively consider how to engage LMs identifying with other genders, as well as those with less engaged/ interested in the topic area mental health at work. The self-selection of participants mean that participants were likely to be those LMs who were interested and motivated to learn about how they could develop their own skills and competencies in this area.

The web-based application would not allow us to track participants through the modules as they completed them due to budgetary constraints. Therefore, we are not able to report the proportion of modules completed by participants or the average completion time. Future work on this intervention will seek to address some of these limitations through developing a more sophisticated delivery platform which would enable tracking

and feedback to participants on their completion progress through the MMW intervention.

Conclusion

This feasibility pilot cluster RCT demonstrated the MMW digital training intervention had good acceptability, usability and utility and that organisations and LMs could be recruited to and retained within a trial. Furthermore, MMW demonstrated that it has the potential to improve LMs confidence and competencies to prevent poor mental health among those they manage. Future research will assess the impact of these improvements over a longer period and how they may influence DRs.

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Conflict of Interest

None to declare.

Abbreviations

LM – Line managers

DR – Direct reports

RCT – Randomized control trial

UK – United Kingdom

MMW – Managing Minds at Work

Data Availability

Data can be made available on request.

References

1. World Health Organisation. Mental Health at Work. 2024. <https://www.who.int/news-room/fact-sheets/detail/mental-health-at-work> [accessed 07.02.2025]
2. Deloitte. Mental Health and Employers: the case for investment. 2022. <https://www2.deloitte.com/content/dam/Deloitte/uk/Documents/consultancy/deloitte-uk-mental-health-report-2022.pdf> [Accessed 07.02.2025]
3. Health and Safety Executive. Health and safety at work: summary statistics for Great Britain. 2022. https://www.ukata.org.uk/documents/424/Health_and_Safety_Statistics_2022.pdf [Accessed 07.02.2025]
4. Office for National Statistics. Sickness absence in the UK labour market: 2022. 2023. <https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/labourproductivity/articles/sicknessabsenceinthelabourmarket/2022> [Accessed 07.02.2025]
5. Hassard J, Teoh K, Thomson L, Blake H. (2021). Understanding the cost of mental health at work: an integrative framework. In: Wall T, Cooper C, editors. The SAGE Handbook of Organisational Wellbeing. London: Sage; 2021. ISBN 9781529704860
6. Deloitte. Mental Health and employers: the case for employers to invest in supporting working parents and a mentally healthy workplace. 2024. <https://www.deloitte.com/content/dam/assets-zone2/uk/en/docs/services/consulting/2024/deloitte-uk-mental-health-report-2024-final-new.pdf> [Accessed 07.02.2025]
7. Benning FE, van Oostrom SH, van Nassau F, Schaap R, Anema JR, Proper KI. The implementation of preventive health measures in small- and medium-sized enterprises—a combined quantitative/qualitative study of its determinants from the perspective of enterprise representatives. *Int J Environ Res Public Health*. 2022; 19:3904. doi: 10.3390/ijerph19073904 <https://doi.org/10.3390/ijerph19073904>
8. Eurofound & EU-OSHA. Psychosocial Risks in Europe: Prevalence and Strategies for Prevention; Publications Office of the European Union: Luxemburg, Luxemburg, 2014. <https://osha.europa.eu/en/publications/reports/psychosocial-risks-eu->

- [prevalence-strategies-prevention](#). [Accessed 07.02.2025]
9. National Institute for Health and Care Excellence. Mental Wellbeing at Work. NICE guideline [NG212]. 2022. <https://www.nice.org.uk/guidance/ng212> [Accessed 07.02.2025]
 10. Carbone SR. Flattening the curve of mental ill-health: the importance of primary prevention in managing the mental health impacts of COVID-19. *Mental Health & Prevention*. 2020; 19:200185. doi: 10.1016/j.mhp.2020.200185
 11. Mental Health Commission of Canada. National Standard for Psychological Health and Safety in the Workplace. 2013. <https://mentalhealthcommission.ca/national-standard/#:~:text=The%20National%20Standard%20of%20Canada,preventing%20psychological%20harm%20at%20work> [Accessed 07.02.2025]
 12. SafeWork Australia. Work-related Psychological Health and safety. 2019. https://www.safeworkaustralia.gov.au/system/files/documents/1911/work-related_psychological_health_and_safety_a_systematic_approach_to_meeting_your_duties.pdf [Accessed 07.02.2025]
 13. Leka S, Jain A, Widerszal-Bazyl M, Żołnierczyk-Zreda D, Zwetsloot G. Developing a standard for psychosocial risk management: PAS 1010, Safety Science. 2011; 49(7):1047-1057. doi:10.1016/j.ssci.2011.02.003.
 14. ISO Standards. ISO 45003:2021. Occupational Health and Safety Management — Psychological Health and Safety at Work — Guidelines for Managing Psychosocial Risks. 2021. <https://www.iso.org/standard/64283.html> [Accessed 07.02.2025]
 15. ILO. Mental Health at Work policy Brief. 2022. <https://iris.who.int/bitstream/handle/10665/362983/9789240057944-eng.pdf?sequence=1> [Accessed 07.02.2025]
 16. WHO. Guidelines on mental health at work. 2022. <https://www.who.int/publications/item/9789240053052> [Accessed 07.02.2025]
 17. Dextras-Gauthier J, Marchand A, Haines III V. Organizational culture, work organization conditions, and mental health: A proposed integration. *International Journal of Stress Management*. 2012;19(2):81. doi: 10.1037/a0028164
 18. Hammer LB. The role of workplace managers in protecting and promoting employee mental health. *Nature Mental Health*. 2024;2(9):1004-5. doi.org/10.1038/s44220-

024-00308-z

19. Newman SA, Ford RC. Five steps to leading your team in the virtual COVID-19 workplace. *Organizational Dynamics*. 2021;50(1):100802. doi: 10.1016/j.orgdyn.2020.100802
20. Gray D, De Haan E, Bonneywell S. Coaching the 'ideal worker': female leaders and the gendered self in a global corporation. *European Journal of Training and Development*. 2019;43(7/8):661-81. doi: 10.1108/EJTD-01-2019-0011
21. Martin A, Woods M, Dawkins S. How managers experience situations involving employee mental ill-health. *International Journal of Workplace Health Management*. 2018;11(6):442-63. doi: 10.1108/ijwhm-09-2017-0069
22. Davenport LJ, Allisey AF, Page KM, LaMontagne AD, Reavley NJ. How can organizations help employees thrive? The development of guidelines for promoting positive mental health at work. *Int. J. Work. Health Manag*. 2016;9:411–427. ISSN: 1753-8351
23. Edmondson AD. *The Fearless Organization: Creating Psychological Safety in the Workplace for Learning, Innovation, and Growth*; John Wiley & Sons Inc.: Hoboken, NJ, USA, 2019. ISBN: 978-1-119-47726-6
24. Nexø MA, Kristensen JV, Grønvad MT, Kristiansen J, Poulsen OM. Content and quality of workplace guidelines developed to prevent mental health problems: Results from a systematic review. *Scand. J. Work. Environ. Health*. 2018;44:443–457. doi: 10.5271/sjweh.3731
25. Enterprise Research Centre. *Workplace Mental Health in Midlands Firms 2021: Baseline Report*. 2021. <https://www.enterpriseresearch.ac.uk/wp-content/uploads/2021/09/ERC-Report-Workplace-Mental-Health-in-Midlands-Firms-2021.pdf> [Accessed 07.02.2025]
26. Institute for Occupational Safety and Health. *White Paper—Workplace Wellbeing: The Role of LMs in Promoting Positive Mental Health*. Management Today, 2019. <https://iosh.com/media/zcinwdnp/iosh-research-workplace-wellbeing-management-today-whitepaper.pdf> [Accessed 07.02.2025]
27. Blake H, Hassard J, Dulal-Arthur T, Wishart M, Roper S, Bourke J, Belt V, Bartle C, & Thomson L. Typology of employers offering line manager training for mental

- health. Occupational Medicine. 2024;74(3): 242-250.
<https://academic.oup.com/occmed/article/74/3/242/7667610> doi:
10.1093/occmed/kqae025
28. For additional recent SR/Meta-a
29. Dulal-Arthur T, Hassard J, Bourke J, Wishart M, Bartle C, Roper S, Belt V, Leka S, Pahl N, Thomson L and Blake H. Line manager training in mental health and presenteeism: a secondary data analysis of organisational-level data. *Journal of Occupational and Organisational Psychology*. 2024; 98(1):e12552. doi.org/10.1111/joop.12552
30. Dulal-Arthur T, Hassard J, Bourke J, Roper S, Wishart M, Belt V, Bartle C, Pahl N, Thomson L, Blake H. Line manager training and organisational approaches to supporting wellbeing. *Occupational Medicine*. 2024; 74(6):416-422. doi.org/10.1093/occmed/kqae051
31. Hassard J, Dulal-Arthur T, Bourke J, Wishart M, Roper S, Belt V, Leka S, Pahl N, Bartle C, Thomson L, Blake, H. The Relationship between Line Manager Training in Mental Health and Organisational Outcomes. *PLoS One*. 2024; <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0306065> doi.org/10.1371/journal.pone.0306065
32. Kuehnl A, Seubert C, Rehfuess E, von Elm E, Nowak D, Glaser J. Human resource management training of supervisors for improving health and well-being of employees. *Cochrane Database Syst Rev*. 2019;9(9):CD010905. doi: 10.1002/14651858.CD010905.pub2
33. Gayed A, Milligan-Saville JS, Nicholas J, Bryan BT, LaMontagne AD, Milner A, et al. Effectiveness of training workplace managers to understand and support the mental health needs of employees: a systematic review and meta-analysis. *Occup Environ Med*. 2018;75(6):462–70. doi: 10.1136/oemed-2017-104789
34. Stuber F, Seifried-Dübon T, Rieger MA, Gündel H, Ruhle S, Zipfel S, Junne F. The effectiveness of health-oriented leadership interventions for the improvement of mental health of employees in the health care sector: a systematic review. *International archives of occupational and environmental health*. 2021 Feb;94:203-20. doi: 10.1007/s00420-020-01583-w

35. Dimoff JK, Kelloway EK. With a little help from my boss: the impact of workplace mental health training on leader behaviors and employee resource utilization. *J Occup Health Psychol* 2019;24:4–19. doi: 10.1037/ocp0000126
36. Dimoff JK, Kelloway EK, Burnstein MD. Mental health awareness training (MHAT): the development and evaluation of an intervention for workplace leaders. *Int J Stress Manag* 2016;23(2):167-189 doi: 10.1037/a0039479
37. Gayed A, Bryan BT, LaMontagne AD et al. . A cluster randomized controlled trial to evaluate HeadCoach: an online mental health training programme for workplace managers. *J Occup Environ Med* 2019;61:545–551. doi: 10.1186/s12888-018-1603-4
38. Gayed A, Strudwick J, Kugenthiran N, LaMontagne AD, Mackinnon A, Christensen H, Glozier N, Harvey S. Mental health training for physicians supervising resident physicians: a cluster randomised controlled trial. *Medical Journal of Australia*. 2024;221(5):270-6. doi: 10.5694/mja2.52407
39. Hammer LB, Brady JM, Brossoit RM et al. . Effects of a Total Worker Health® leadership intervention on employee well-being and functional impairment. *J Occup Health Psychol*. 2021;26:582–598. doi:10.1037/ocp0000312
40. Milligan-Saville JS, Tan L, Gayed A et al. . Workplace mental health training for managers and its effect on sick leave in employees: a cluster randomised controlled trial. *Lancet Psychiatry* 2017;4:850–858 doi: 10.1016/s2215-0366(17)30372-3
41. Stansfeld SA, Kerry S, Chandola T, Russell J, Berney L, Hounsborne N, et al. Pilot study of a cluster randomised trial of a guided e-learning health promotion intervention for managers based on management standards for the improvement of employee well-being and reduction of sickness absence: GEM study. *BMJ Open* 2015;5(10):e007981. doi: 10.1136/bmjopen-2015-007981
42. Mitsakis F, Karageorgakis T. E-learning: a temporary 'by-product' of COVID-19 pandemic or a contemporary solution to workplace training and learning? In: Stewart J, Loon M, Nachmias S, editors. *The Future of HRD, Volume I: Innovation and Technology*. Cham, Switzerland: Palgrave Macmillan; 2020:167-191
43. David O, Salleh M, Iahad NA. The impact of e-learning in workplace: focus on organizations and healthcare environments. *Int Arab J Technol* 2012;2(4):203-209

44. Caudill JG. Employee motivations for workplace learning and the role of eLearning in the workplace. *J Online Learn Res Pract* 2015;4(2):26908;
45. Cheng B, Wang M, Yang SJ, Kinshuk, Peng J. Acceptance of competency-based workplace e-learning systems: effects of individual and peer learning support. *Comput Educ* 2011;57(1):1317-1333. doi: 10.1016/j.compedu.2011.01.018
46. Blake H, Vaughan B, Bartle C, Yarker J, Munir F, Marwaha S, ... Thomson L. Managing minds at work: development of a digital line manager training program. *Int J Environ Res Public Health*. 2022;19(13):8006 [doi:10.3390/ijerph19138006]
47. Thomson L, Hassard J, Frost A, Bartle C, Yarker J, Munir F, Kneller R, Marwaha S, Daly G, Russell S, Meyer C, Vaughan B, Newman K, Blake H Digital Training Program for Line Managers (Managing Minds at Work): Protocol for a Feasibility Pilot Cluster Randomized Controlled Trial *JMIR Res Protoc* 2023;12:e48758 URL: <https://www.researchprotocols.org/2023/1/e48758> doi:10.2196/48758
48. Eysenbach G, CONSORT-EHEALTH Group. CONSORT-EHEALTH: Improving and Standardizing Evaluation Reports of Web-based and Mobile Health Interventions. *J Med Internet Res*. 2011;13(4):e126. doi: 10.2196/jmir.1923
49. Hoffmann TC, Glasziou PP, Boutron I, Milne R, Perera R, Moher D, ... & Michie S. Better reporting of interventions: template for intervention description and replication (TIDieR) checklist and guide. *BMJ*. 2014;348:g1687. doi.org/10.1136/bmj.g1687
50. Xerte. Xerte: an apereo community project. 2025. www.xerte.org.uk [Accessed 27.01.2025]
51. Nieuwenhuijsen K, Verbeek JH, de Boer AG, Blonk RW, van Dijk FJ. Supervisory behaviour as a predictor of return to work in employees absent from work due to mental health problems. *Occup Environ Med* 2004;61(10):817-823 doi: 10.1136/oem.2003.009688
52. Gayed A, Bryan BT, Petrie K, Deady M, Milner A, LaMontagne AD, Calvo RA, Mackinnon A, Christensen H, Mykletun A, Glozier N. A protocol for the HeadCoach trial: the development and evaluation of an online mental health training program for workplace managers. *BMC psychiatry*. 2018;18:1-9. doi: 10.1186/s12888-018-1603-4.
53. Bryan BT, Gayed A, Milligan-Saville JS, Madan I, Calvo RA, Glozier N, Harvey SB.

- Managers' response to mental health issues among their staff. *Occupational Medicine*. 2018;68(7):464-8. doi: 10.1093/occmed/kqy103
54. Evans-Lacko S, Little K, Meltzer H, Rose D, Rhydderch D, Henderson C, Thornicroft G. Development and psychometric properties of the mental health knowledge schedule. *The Canadian Journal of Psychiatry*. 2010;55(7):440-448. doi: 10.1177/070674371005500707
55. Moll S, Zanhour M, Patten SB, Stuart H, MacDermid J. Evaluating mental health literacy in the workplace: development and psychometric properties of a vignette-based tool. *J Occup Rehabil* 2017;27(4):601-611 doi: 10.1007/s10926-017-9695-0
56. Wulf IC. Help-Seeking and Help-Outreach Intentions of Healthcare Workers—The Role of Mental Health Literacy and Stigma in the Workplace. *Frontiers in Education*. 2022;7:856458. doi.org/10.3389/feduc.2022.856458
57. Tennant R, Hiller L, Fishwick R, Platt S, Joseph S, Weich S, Parkinson J, Secker J, Stewart-Brown S. The Warwick-Edinburgh mental well-being scale (WEMWBS): development and UK validation. *Health and Quality of life Outcomes*. 2007 Dec;5:1-3. doi.org/10.1186/1477-7525-5-63
58. Lloyd K, Devine P. Psychometric Properties of the Warwick–Edinburgh mental well-being scale (WEMWBS) in Northern Ireland. *Journal of Mental Health*. 2012;21(3):257-63. doi: 10.3109/09638237.2012.670883
59. HSE. Stress Management Competency Indicator Tool. 2009. URL: <https://www.hse.gov.uk/stress/assets/docs/mcit.pdf> [Accessed 27.01.2025]
60. Yarker J, Donaldson-Feilder E, Lewis R, Flaxman PE. Management competencies for preventing and reducing stress at work: Identifying and developing the management behaviours necessary to implement the HSE Management Standards. 2007. HSE Books: London
61. Yarker J, Lewis R, Donaldson-Feilder E. Management competencies for preventing and reducing stress at work: identifying and developing the management behaviours necessary to implement the HSE management standards: phase two. Health and Safety Executive. 2008. URL: <https://www.hse.gov.uk/research/rrpdf/rr633.pdf> [Accessed 27.01.2025]
62. Toderi S, Sarchielli G. Psychometric properties of a 36-item version of the “stress

- management competency indicator tool". International journal of environmental research and public health. 2016;13(11):1086. doi: 10.3390/ijerph13111086
63. Houdmont J, Jachens L, Randall R, Colwell J, Gardner S. Stress management competency framework in English policing. Occupational Medicine. 2020;70(1):31-7. doi: 10.1093/occmed/kqz143
64. IBM. SPSS v28 <https://www.ibm.com/support/pages/node/6445443> [Accessed 07.02.2025]
65. Osborne JW. Best practices in data cleaning: A complete guide to everything you need to do before and after collecting your data. London, Sage; 2012. doi.org/10.4135/9781452269948
66. Field A. Discovering statistics using IBM SPSS statistics. London, Sage; 2017. ISBN: 9781529630008
67. Cohen J. Statistical power analysis for the behavioral sciences. Routledge; 1988. ISBN 9780203771587
68. Braun V, Clarke V. Thematic analysis: a practical guide. London, Sage; 2022. ISBN 978-1-4739-5325-9
69. LeBreton JM, Senter JL. Answers to 20 questions about interrater reliability and interrater agreement. Organizational Research Methods. 2008;11(4):815-52. doi.org/10.1177/1094428106296642
70. Kreft IG, De Leeuw J. Introducing multilevel modeling. London, Sage; 1998. ISBN: 9780761951414
71. Axén I, Brämberg EB, Bakken AG, Kwak L. Communication: Recruiting in intervention studies: challenges and solutions. BMJ Open. 2021;11(1). Doi: 10.1136/bmjopen-2020-044702
72. Gustavson K, von Soest T, Karevold E, Røysamb E. Attrition and generalizability in longitudinal studies: findings from a 15-year population-based study and a Monte Carlo simulation study. BMC Public Health. 2012;12:1-11 doi.org/10.1186/1471-2458-12-918
73. Scheutzow J, Attoe C, Harwood J. Acceptability of web-based mental health interventions in the workplace: systematic review. JMIR Mental Health. 2022;9(5):e34655. doi:10.2196/34655

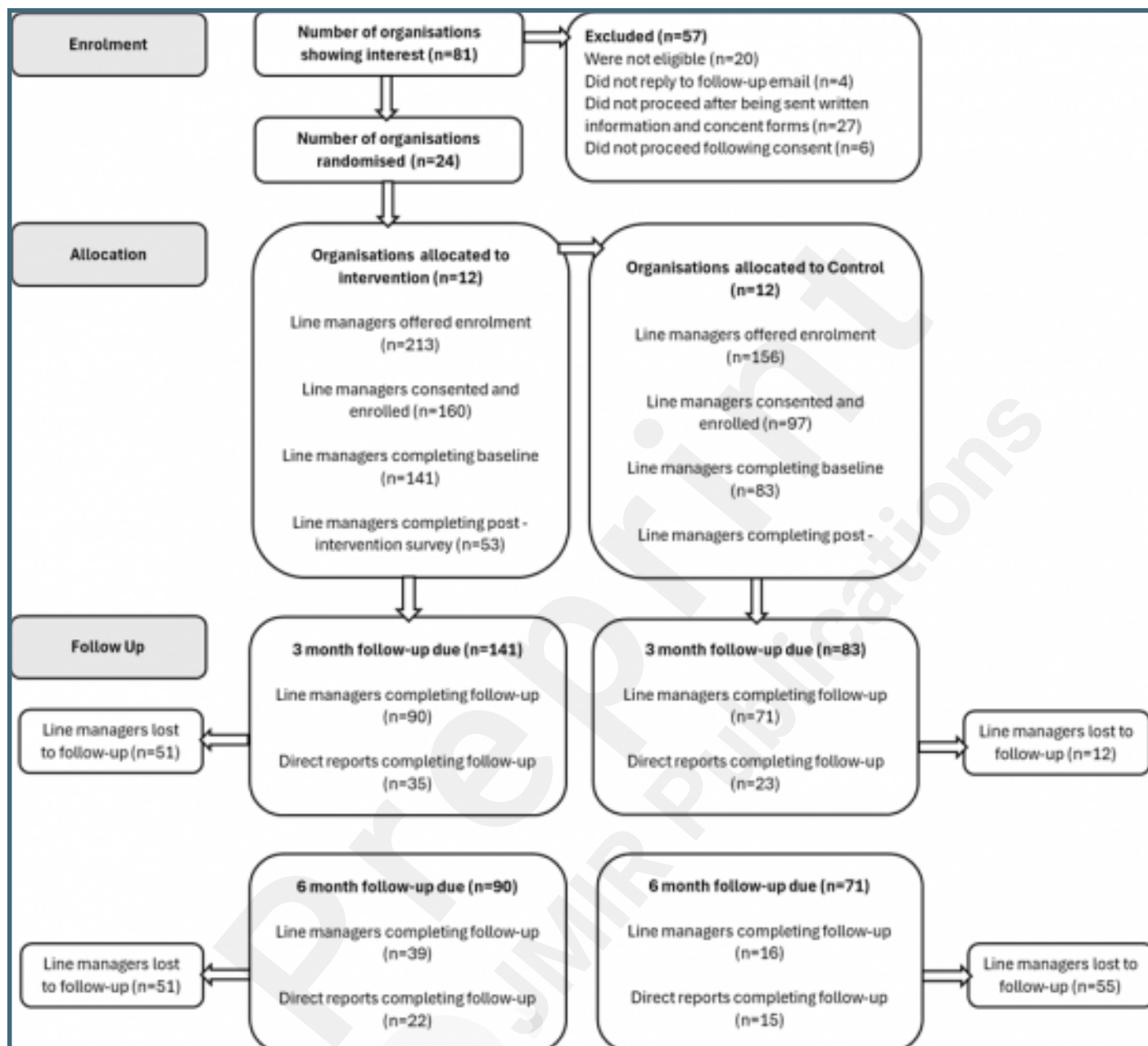
74. Carolan S, de Visser RO. Employees' perspectives on the facilitators and barriers to engaging with digital mental health interventions in the workplace: qualitative study. *JMIR mental health*. 2018;5(1):e9146. doi: 10.2196/mental.9146
75. Carolan S, Harris PR, Cavanagh K. Improving employee well-being and effectiveness: systematic review and meta-analysis of web-based psychological interventions delivered in the workplace. *Journal of Medical Internet Research*. 2017;19(7): e271. doi:10.2196/jmir.7583
76. van der Feltz-Cornelis CM, Shepherd J, Gevaert J, Van Aerden K, Vanroelen C, Cepa OB, ... Olaya B. Design and development of a digital intervention for workplace stress and mental health (EMPOWER). *Internet interventions*. 2023;34: 100689. doi: 10.1016/j.invent.2023.100689
77. LaMontagne AD, Martin A, Page KM. Workplace mental health: developing an integrated intervention approach. *BMC Psychiatry*. 2014;14:131. doi.org/10.1186/1471-244X-14-131
78. Martin A, Shann C, LaMontagne AD. Promoting workplace mental wellbeing: a rapid review of recent intervention research. *Handbook of disability, work and health*. 2019:1-9. doi:10.1007/978-3-030-24334-0_15
79. Quirk H, Crank H, Carter A, Leahy H, Copeland RJ. Barriers and facilitators to implementing workplace health and wellbeing services in the NHS from the perspective of senior leaders and wellbeing practitioners: a qualitative study. *BMC Public Health*. 2018;18(1):1-14. doi: 10.1186/s12889-018-6283-y
80. Schofield B, Rolfe U, McClean S, Hoskins R, Voss S, Bengner J. What are the barriers and facilitators to effective health promotion in urgent and emergency care? A systematic review. *BMC Emergency Medicine*. 2022;22(1):1-13. doi: 10.1186/s12873-022-00651-3
81. Daniels K, Watson D, Nayani R, Tregaskis O, Hogg M, Etuknwa A, Semkina A. Implementing practices focused on workplace health and psychological wellbeing: A systematic review. *Social Science & Medicine*. 2021;277:113888. doi: 10.1016/j.socscimed.2021.113888
82. Yarker J, Lewis R, Sinclair A, Georgia M, Munir F. Meta-synthesis of qualitative research on the barriers and facilitators to implementing workplace mental health

- interventions. SSM-Mental Health. 2022;100148. doi:[10.1016/j.ssmmh.2022.100148](https://doi.org/10.1016/j.ssmmh.2022.100148)
83. Totton N, Lin J, Julious S. A review of sample sizes for UK pilot and feasibility studies on the ISRCTN registry from 2013 to 2020. Pilot Feasibility Stud. 2023;9:188 doi: 10.1186/s40814-023-01416-w
84. Lancaster GA. Pilot and feasibility studies come of age! Pilot Feasibility Stud. 2015;1(1):1 doi.org/10.1186/2055-5784-1-1
85. Bowen DJ, Kreuter M, Spring B, Linnan L, Weiner D, Bakken S, et al. How we design feasibility studies. Am J Prev Med. 2010;36(5):452–7. doi: 10.1016/j.amepre.2009.02.002.
86. Simmons L, Jones T, Bradley E. Reducing mental health stigma: The relationship between knowledge and attitude change. European Journal of Mental Health. 2017;1(12):25-40. doi: 10.5708/EJMH.12.2017.1.2.

Supplementary Files

Figures

Participant flow chart.



Multimedia Appendixes

e Consort checklist.

URL: <http://asset.jmir.pub/assets/158136dad66730e3c9c161449f8d08f7.pdf>

TIDieR Checklist.

URL: <http://asset.jmir.pub/assets/d1d9c5cb637a214a19d92924fbf1927f.pdf>

