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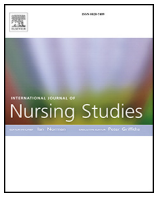

Promoting resilience in mental health nurses: A partially clustered randomised controlled trial

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ABSTRACT

Background: There is a critical global shortage of nurses in mental health, with workforce attrition due in large part to workplace stressors. Proactive strengths-based interventions to strengthen nurses' capacity to manage stress and improve mental health, wellbeing and resilience may also support workforce retention.
Objective: To determine the effects of a resilience-building programme on mental health nurses' coping self-efficacy (primary outcome), and psychological distress, wellbeing, resilience, posttraumatic growth, emotional intelligence behaviours, workplace belonging, and turnover intention (secondary outcomes).
Design: Partially clustered randomised controlled trial.
Setting: Large tertiary metropolitan mental health service in Australia.
Participants: A total of 144 registered and enrolled nurses working clinically ≥0.6 full-time equivalent (73/intervention, 71/control), with 122 completing 3-month follow-up.
Methods: The Promoting Resilience in Nurses programme is an evidence-based workplace intervention delivered by trained facilitators across two workshops. Surveys were administered online upon registration and prior to randomisation (Time 1) into Intervention or Control (no intervention) arms, and immediately after the final workshop (Time 2), and at three months follow-up (Time 3). Linear mixed models for outcome measures were fitted to Time 2 and 3 responses.
Results: There were seven intervention groups, with seven to 13 participants per group. Coping self-efficacy improved at Time 2 (estimated intervention effect 21.2 units, 95 % Confidence Intervals: 13.3 to 29.0) and Time 3 (12.1 units, 4.7 to 19.6), as well as wellbeing (Time 2: 9.2 units, 5.0 to 13.4), resilience (Time 2: 0.24 units, 0.01 to 0.46) and posttraumatic growth (Time 2: 16.1 units, 7.0 to 25.3). Psychological distress reduced (Time 2: −3.7 units, −6.2 to −1.31). All were sustained at three months. Emotional intelligence behaviours were improved (Time 2: 3.5 units, 0.6 to 6.5) but not sustained. Workplace belonging improved at Time 3 (0.34 units, 0.02 to 0.65) only. No statistically significant effects for turnover intention.
Conclusions: Despite major contextual challenges, the Promoting Resilience in Nurses programme achieved the aims of promoting nurses' efficacy to cope with stress and regulate their emotions and improving mental health and wellbeing. The findings support the programme as a feasible and successful intervention for nurses across other settings and contexts.
Trial registration: Australian New Zealand Clinical Trials Registry (ACTRN12620001052921). Registered 15/10/2020. First recruitment 04/02/2021.
Tweetable abstract: Promoting Resilience in Nurses intervention improved coping self-efficacy, wellbeing, resilience, posttraumatic growth, emotional intelligence and psychological distress.

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What is already known

- Workplace stressors can impact nurses' mental health and wellbeing.
- Improving nurses' resilience may help reduce turnover intention and workplace attrition.
- Limited evidence is available for successful interventions to improve mental health nurses' resilience and wellbeing.

What this paper adds

- Mental health nurses' coping self-efficacy, wellbeing, resilience, posttraumatic growth, emotional intelligence behaviours, workplace belonging and psychological distress can be modified by a tailored resilience intervention.
- Improvements in nurses' coping self-efficacy, mental health and wellbeing, resilience and posttraumatic growth can be sustained in the longer term (three months) following a resilience intervention.

1. Background

In the specialist field of mental health, nurses are 44 % of the workforce (International Council of Nurses, 2022). Nursing workforce shortages have long been identified, with the COVID-19 pandemic exacerbating attrition and projected workforce shortfalls (Peters, 2023). Attrition in mental health is related to workplace stressors including poor staffing and skill mix, inadequate support from organisations (e.g., management), high workloads, and unsafe work environments (Delgado et al., 2022; McTiernan and McDonald, 2015). These stressors have substantial psychosocial impacts for nurses including high prevalence of mental health concerns with posttraumatic stress disorder (47 %), anxiety (38 %) and depression (41 %) (Havaei et al., 2021) reported globally, and between one-third and one-half of nurses reporting anxiety and stress across European, Western Pacific and South-East, and Eastern Mediterranean regions (Varghese et al., 2021). The COVID-19 pandemic has added significant disruptions and challenges, including restructuring of care models, managing risk of infection to staff and clients, and trying to maintain therapeutic rapport while using personal protective equipment (Foye et al., 2021; Gao and Tan, 2021; Ward-Miller et al., 2021).

Due to the relational nature of their interpersonal work, mental health nurses require strong cognitive, emotional and relational skills and the ability to self-regulate. They are often exposed to challenging situations in providing interpersonal care to people in mental and emotional distress, and/or with self-harm or suicidal behaviours, as well as managing clinical aggression and interpersonal conflicts (Baby et al., 2014; Cranage and Foster, 2022). Two-thirds of mental health nurses report work-related stressors across consumer/carer, collegial and organisational factors (Foster et al., 2021). The impacts of these acute (e.g., violence) and chronic (e.g., staff shortages) stressors can compromise mental health nurses' wellbeing, and therapeutic practice (Roviralta-Vilella et al., 2019), and lead to burnout (López-López et al., 2019), and job dissatisfaction (Baum and Kagan, 2015), and affect workforce retention (Adams et al., 2021).

Stressors can also impact mental health nurses' own mental health, resulting in lower mental health than population norms (Foster et al., 2021). In Australia, a national cross-sectional survey ($n = 482$) found approximately one in five mental health nurses reported at least moderately severe levels of depression (20 %) and anxiety (19 %) (Delgado et al., 2021). Approximately one in 20 report extremely severe levels of depression and anxiety (Delgado et al., 2021) and between 14 % and 17 % meet posttraumatic stress disorder criteria (Lee et al., 2015). Mental distress, including symptoms of depression, anxiety and stress, has been negatively associated with psychological wellbeing and workplace resilience for mental health nurses (Delgado et al., 2021). Two international reviews have examined mental health nurses' resilience and associations with factors important for their wellbeing and practice (e.g., psychological wellbeing, distress, etc.). These reviews reported low to moderate (Bui et al., 2023) and moderate to high levels of resilience across studies (Foster et al., 2019).

Resilience is a multi-faceted psychological construct that can be understood as the dynamic process of positive adaptation following adversity (McLarnon and Rothstein, 2013), which includes the ability to recover from stress (Smith et al., 2008). As an adaptive process, resilience involves interaction between multiple protective (or resilience-promoting) factors. These include *personal* factors such as coping self-efficacy (a primary resilience-promoting factor), and cognitive and emotional self-regulation and emotional intelligence, as well as *external* factors including social support (McLarnon and Rothstein, 2013; Ye et al., 2022). Resilience is the adaptive process by which an individual's mental health and wellbeing is restored following stress and adversity (McLarnon and Rothstein, 2013). Wellbeing is a complex, multifaceted construct which includes having a purpose in life, experiencing agency, personal growth, and environmental mastery (Ryff, 2013). Coping self-efficacy is a robust and primary resilience-promoting factor and is the perceived ability to be able to deal with issues or barriers when they arise (Schwarzer and Renner, 2000). People with higher coping self-efficacy may experience less stress when faced with difficult or challenging situations (Baluszek et al., 2023; Meyer et al., 2022). Some people can also experience positive psychological growth (posttraumatic growth) and transformation following traumatic or highly challenging circumstances (Tedeschi et al., 2018), which involves cognitive growth and positive behaviours such as an appreciation of life or improved relationships with others (Shakespeare-Finch and Barrington, 2012).

In the context of work, emotional intelligence involves the capacity to recognise and manage self and others' emotional responses (Palmer et al., 2009), and is a key resilience-promoting factor which has been associated with nurses' wellbeing and delivery of patient care (Halter et al., 2017). Further, a sense of workplace belonging (i.e., feeling accepted and valued by those within the workplace) has been associated with nurses' wellbeing (Somoray et al., 2017) and with reduced distress and stronger resilience levels for staff working in potentially traumatic settings (Shakespeare-Finch and Daley, 2017). Evidence indicates that the promotion and enablement of worker resilience is a key strategy to address and diminish the pervasive effects of workplace stress (Shochet et al., 2011). Strengths-based resilience interventions are needed to promote and strengthen mental health nurses' ability to cope with stressors, improve their interpersonal practice, and help improve their mental health, wellbeing and resilience.

There have been increasing reports of resilience interventions in reviews of the wider field of nursing (Delgado et al., 2017; Henshall et al., 2022; Kunzler et al., 2022; Zhai et al., 2021), but few interventions reported in mental health nursing (Foster et al., 2019; Bui et al., 2023). Exceptions are two pilot studies using pre-post designs (Foster et al., 2018a; Henshall et al., 2020) and one pilot randomised controlled trial (Henshall et al., 2023). In the UK, Henshall et al.'s (2020) pre-post study demonstrated statistically significant improvements in forensic nurses' ($n = 29$) self-reported personal resilience and self-confidence following a face-to-face resilience intervention. The authors then conducted a pilot randomised controlled trial of a web-based Resilience Enhancement Online Training for Nurses (Henshall et al., 2023). Although participants ($n = 93$ nurses in community and mental health services) reported sessions as being helpful for their personal wellbeing, resilience, self-confidence, and collegial relationships, there were no statistically significant differences between programme and control groups on resilience or wellbeing scores. In Australia, the Promoting Adult Resilience (PAR) Programme (Liossis et al., 2009; Millear et al., 2008; Shochet et al., 2007) was piloted in a pre-post study with 24 mental health nurses (Foster et al., 2018a). After programme completion, statistical results indicated coping self-efficacy significantly increased, and anxiety significantly decreased, with stress levels significantly lower at

3-month follow-up (all with moderate effect sizes). Participants were highly satisfied with the programme (Foster et al., 2018a) and found it beneficial to help reinforce both their understanding of, and how to strengthen their resilience (Foster et al., 2018b). The PAR programme was then tailored for mental health nurses and the subsequent Promoting Resilience in Nurses (PRiN©) Programme was trialled in the current study.

1.1. Aim

The primary aim was to determine the effects of a resilience-building programme on mental health nurses' coping self-efficacy (primary outcome). The secondary outcomes were psychological distress, psychological wellbeing, resilience, posttraumatic growth, emotional intelligence behaviours, workplace belonging, and turnover intention.

2. Methods

2.1. Research design

A partially clustered randomised controlled trial design was used, meaning that there was clustering of participants in one arm only; that is, the treatment arm. There was no clustering in the control arm. This design allows for comparing the Promoting Resilience in Nurses' intervention participants (clustered by the groups of nurses receiving the programme) to a control group of individual nurses (not clustered) (Li and Hedeker, 2017). As such, this design features clustering within the treatment arm according to programme, and comparison with individuals in the control arm (Lohr et al., 2014). The partially clustered design and corresponding analysis accounts for i) similarities within the intervention arm participants due to the clustering of individuals within group-based intervention delivery (e.g., different facilitators delivering across groups) (Roberts and Roberts, 2005), and ii) control arm participants as individual nurses (not forming groups) and independent from each other.

There were three assessment time points: baseline assessment completed prior to randomisation (T1), assessment immediately after intervention delivery (T2), and 3 months following intervention (T3).

2.2. Modifications to registered trial protocol

The trial was prospectively registered (ACTRN12620001052921) and conducted during the COVID-19 pandemic. The registered trial protocol was modified due to the extenuating circumstances of COVID-19, reported here using CONSERVE-CONSORT guidelines (Orkin et al., 2021). Adherence to State Government policies (e.g., lockdowns) required 1) delays in commencing recruitment into the trial and intervention delivery, and 2) ceasing study recruitment activities for 13 weeks (between 31/08/2021 and 06/12/2021) and intervention delivery for 28 weeks (between 16/07/2021 and 31/01/2022) during the trial period. These changes reduced the data collection period and sample size. The lead investigator ceased trial activities in line with government and health service policies and Human Research Ethics directives, and the team agreed to recommence when appropriate. The decision was not informed by interim data. We subsequently achieved a lower sample size than originally planned. Delivering the programme remotely was not a viable option: an online/e-health programme was not available, and it was too resource-intensive to prepare and implement within the duration of the trial. Further, face-to-face programme delivery is aligned with real-world interpersonal relationships required in the mental health clinical setting. Previous evidence indicated peer group interactions during programme delivery were important for participants' experiences (Foster et al., 2018b). To maintain momentum and recruitment, study information sessions were provided on-line as well as face-to-face. An eligibility criterion for nurses to be working 0.8 was extended to 0.6 full-time equivalent to expand availability to more staff.

2.3. Participants

The study was conducted within a large tertiary metropolitan public mental health service based in Melbourne, Australia, with a population of over 1.5 million people in the catchment area. The overall health service comprised six different service areas or sites (each located in different geographical areas across Melbourne). Each area had its own mental health inpatient and rehabilitation units and community teams, with a total of 11 inpatient or rehabilitation units and 15 community teams across areas, as well as four nursing transition-to-practice programmes across the entire service (i.e. programmes supporting nurses newly transitioning into mental health). There were approximately 695 registered and enrolled nurses working across these teams at study commencement. The trial was conducted during the COVID-19 pandemic and during this period the health service also commenced structural disaggregation, where several areas began splitting off from the overall health service and staff began moving to other jobs. Eligibility criteria for participants were enrolled or registered nurses working clinically at the service at least 0.6 full-time equivalent. Nurses who had participated in the pilot study of the PAR programme were excluded.

2.4. Sample size

Sample size and power had been calculated taking account of the design (Li and Hedeker, 2017), with inputs based on pilot data (Foster et al., 2018a) and the primary outcome of coping self-efficacy at 3-month follow-up. Within-arm standard deviations (SDs) of 40 (intervention) and 36 (control) were used, and a difference in means of 16 units (Cohen's effect size ≈ 0.42) was taken for the minimum difference of interest. Assuming an intraclass correlation of 0.1, alpha $= 0.05$ and a two-sided test, the power, given by formula 4.1 in Li and Hedeker (2017), is 80 %. To allow for attrition of up to 20 %, we had planned a target sample size of 360: 180 in the treatment arm (i.e. 12 groups of 15 participants in each program) and 180 in the control arm. The original sample size calculation was based on the standard (26-item) coping self-efficacy scale (CSES; Chesney et al., 2006). To reduce participant burden, the trial used the short form (13-item) version of the CSES, for which it is reasonable to reduce both the SDs and difference in mean of interest by 50 %, leading to the same required sample size. The final sample size ($n = 144$) achieved in this trial was less than planned due to the impacts of the COVID-19 pandemic.

2.5. Recruitment

Recruitment took place between 4th February 2021 and 23rd March 2022. Staff within each area/transition programme were approached separately for recruitment, with registered and enrolled nurses working in clinical roles invited to attend online or in-person study information sessions delivered by the research team. The researchers then sent an email to the unit/team leaders to be distributed to their nurses in their teams, which provided the participant information sheet and study registration link (REDCap). Interested nurses completed the eligibility survey, and if eligible, completed the Time 1 (T1) survey prior to randomisation. Informed consent was provided by completing the survey. Follow-up surveys were completed immediately after intervention (T2) and between 28/07/2021 and 31/08/2022 (T3). Participants received $30 vouchers for their time on completion of all surveys.

2.6. Randomisation

To manage recruitment from each area or transition programme at a time, an expert independent of the research team developed a block randomisation algorithm based on nursing staff numbers per unit/team. After T1 survey completion, when there were sufficient numbers for allocation to a PRiN programme (e.g., minimum $n = 7$), participants were randomly allocated to either intervention or control group by research

assistants using an automated computer-generated randomisation function. A group size of either 1 or 2 (randomly selected) was used for teams of fewer than 20 members, with the goal of equal assignment within blocks as a ratio 1:1. Investigators were blinded to participant and group identity during the trial. Participants, research assistants (who provided programme details to intervention participants), and analysts (who were required to statistically account for the clustering within the intervention arm) were not blinded to identity or group allocation. The intervention was offered to control group participants at the conclusion of the trial.

2.7. Intervention - Promoting Resilience in Nurses© programme

Following the successful pilot (Foster et al., 2018b), the Promoting Adult Resilience (PAR) programme (Liossis et al., 2009; Millear et al., 2008; Shochet et al., 2007) was tailored by mental health nursing experts in conjunction with the programme developers. The resulting Promoting Resilience in Nurses© programme is a strengths-based programme underpinned by interpersonal theory, cognitive behaviour theory and posttraumatic growth theory. The programme targets key resilience-promoting factors and outcomes, with the aims to promote self-efficacy to cope with stress, increase the mental health and wellbeing of adults in the workplace; promote stress management skills; promote resilience; improve relationships and decrease conflict by increasing interpersonal and communication skills; increase ability to manage and regulate emotions in times of stress and adversity; and promote capacity for posttraumatic growth. There are six modules: identifying strengths and understanding resilience; understanding and managing stress; challenging and changing negative self-talk; drawing strength from adversity; promoting positive relationships and managing conflict; and creating solutions for wellbeing. In tailoring of the programme, modules were adapted so activities and audio-visual materials were relevant in wording and focus for mental health nurses' practice and contexts.

Participants attend two 1-day workshops, delivered three weeks apart, and receive booster activities. Workshops were delivered face-to-face by two trained facilitators (experienced senior mental health nurses) in a peer-group setting. Facilitators were trained and accredited in programme delivery by the programme developers prior to study commencement. The programme is manualised, using various teaching modalities including video clips, didactic sessions, small and large group discussions, and individual activities. Participants receive 'booster' activities via Short Message Service weekly between the two workshop days, and each week for three weeks following the second workshop. These activities take approximately 10 min to complete. For example, participants received a reminder to use thought challenges to change negative self-talk. Delivery of the intervention comprised 23 individual content units across the six modules. Fidelity checklists were completed by facilitators for each programme, with each content unit assessed as 1) Yes, delivered in full, 2) Yes, delivered in part, or 3) No.

2.8. Outcome measures

The T1 survey included participant demographic information: age-group, gender, role (registered or enrolled nurse), years of experience in mental health and in nursing, and 88 items from the following well-established, valid and reliable measures:

Coping self-efficacy (primary outcome) was measured with the 13-item Coping Self-Efficacy scale (Short; CSES) assessing a person's perceived ability to cope effectively with life challenges (Chesney et al., 2006). Item stem is "When things aren't going well for you, how confident are you that you can …" with item including "… find solutions to your most difficult problems" and "…stop yourself from being upset by unpleasant thoughts". The range of values is 0 (cannot do at all) to 10 (certain can do), where higher scores reflect higher levels of self-efficacy with using positive coping strategies. The Cronbach's alpha in this study was 0.93.

Psychological distress was measured using the 10-item Kessler Psychological Distress Scale (K10) (Andrews and Slade, 2001), assessing non-specific psychological distress based on anxiety and depressive symptoms. Participants rate frequency of feelings in the past 30 days from 'all of the time' (value of 1) to 'none of the time' (value of 5). Participants scoring between 10 to 15, 16 to 21, 22 to 29 and 30 to 50 are considered to have low, moderate, high, and very high psychological distress respectively. Items included feeling "… tired out for no good reason" and "… restless or fidgety". The Cronbach's alpha in this study was 0.88.

Wellbeing was measured with the 14-item short form of the Mental Health Continuum (MHC-SF), which assesses mental health and psychological, social, and emotional wellbeing (Keyes et al., 2008). This scale has three subscales: emotional (3 items), social (5 items), and psychological (6 items) wellbeing with items including "satisfied with life", "that people are basically good" and "that your life has a sense of direction or meaning to it". Participants rate frequency of feelings in the past month from 0 (never) to 5 (every day). Participants are categorised as flourishing if they report 'everyday' or 'almost every day' to one of the emotional wellbeing items, and at least six of the remaining items (Keyes et al., 2008). The Cronbach's alpha in this study was 0.92.

Resilience was measured with the 6-item Brief Resilience Scale (BRS) (Smith et al., 2008), which assesses resilience as recovery from stress and coping with stressors. Each item is rated from strongly disagree (value of 1) to strongly agree (value of 5). A total score of 3.70 means moderate (or 'average') resilience, scores below 3.00 mean low and scores above 4.30 mean high. Items include "I tend to bounce back quickly after hard times" and "It is hard for me to snap back when something bad happened". The Cronbach's alpha in this study was 0.84.

Posttraumatic growth was measured using the 21-item Posttraumatic Growth Inventory (PTGI) (Tedeschi and Calhoun, 1996) to quantify positive changes following highly stressful events, including personal strength, new possibilities, relating to others, appreciation of life, and spiritual change. Participants indicate whether they have experienced a traumatic event and briefly describe the event, including when it occurred and the perceived severity of trauma ranging from 1 = moderate to 4 = very severe, and rate impacts of the event from 'not at all' (value of 0) to 'very great degree' (value of 5). Higher scores suggest greater posttraumatic growth. Items include "I established a new path for my life", "I discovered that I'm stronger than I thought I was", and "I have more compassion for others". The Cronbach's alpha in this study was 0.94.

Emotional intelligence behaviours were measured using the 14-item Genos Emotional Intelligence Inventory – Short (GENOS-EI) (Palmer et al., 2009). The measure reflects typical emotional functioning and behaviour at work through self-awareness, emotional expression, emotional awareness of others, emotional reasoning, emotional self-management, emotional management of others, and emotional self-control, and therefore assesses enacted rather than latent emotional intelligence. Frequency of items is rated from 'almost never' (value of 1) to 'almost always' (value of 5), and higher scores reflect higher emotional functioning. Items include "I appropriately communicate decisions to stakeholders" and "When upset at work, I still think clearly". The Cronbach's alpha in this study was 0.83.

Workplace belonging was measured by the 6-item Sense of Belonging subscale from the Psychological Sense of Organizational Membership Scale (PSOM) (Cockshaw and Shochet, 2010). The subscale indicates how people feel at work with items measuring feelings of being accepted, valued, and needed by an organisation. Participants indicate how true statements are for them: ranging from 1 (not at all true) to 5 (completely true), with higher total scores reflecting stronger sense of belonging. Items include "People here notice when I'm good at something" and "I am included in lots of activities at this organization". The Cronbach's alpha in this study was 0.87.

Turnover intention was measured using the 4-item Turnover Intention Scale (TIS) (Kelloway et al., 1999), with items covering thoughts

about leaving the current organisation and seeking job opportunities. Participants indicate agreement with items ranging from 1 (strongly disagree) to 5 (strongly agree), with higher scores suggesting greater turnover intention. The Cronbach's alpha in this study was 0.90.

2.9. Statistical analysis

A linear mixed model was fitted to each outcome measure (i.e., 8 models conducted) at Time 2 (T2) and Time 3 (T3). Each model included fixed effect explanatory variables of T1 treatment arm (intervention or control) and random effects of programme delivery group (applicable in the intervention arm only) and participant. This approach allows for individual data to be used while accounting for the clustering within the intervention arm groups, and the repeated measures on participants. Including the T1 measure allows a statistically efficient estimation of the intervention effect (rather than calculating raw score differences between time points). Intra-cluster correlations were estimated for each model, using complete case analyses. These were 0.044 for PSOM, 0.001 for CSES and zero for the other outcomes, indicating that cluster effects were generally minimal.

There were missing data for a number of variables, either because participants did not provide any data at a given time point, or because they omitted responses to particular questions. The extent of missing data ranged from 0 % (all present) for several variables, up to 37.5 % missing for PTGI at T2. Missing data were handled using multiple imputation (Sterne et al., 2009), preserving intention to treat. The variables used in the multiple imputation models were age, gender (female or not), number of years in mental health nursing, and each outcome measure at T1, T2 and T3: specifically, coping self-efficacy, psychological distress, wellbeing, resilience, posttraumatic growth, emotional intelligence behaviours, workplace belonging, and turnover intention; 27 variables in total. The multiple imputation process was carried out separately for the intervention and control groups, using predicted mean matching (Morris et al., 2014); the intervention group required multilevel predicted mean matching due to the clustering in groups. The number of imputed datasets was 100. For each of these 100 datasets and each of the eight outcomes separately, the linear mixed model described in the methods was applied, and inferences were then obtained using Rubin's rules. For reference and comparison, completed case analyses were also carried out.

Treatment estimates (intervention minus control) and associated 95 % confidence intervals and p-values are reported for all outcome measures at T2 and T3. Analyses were carried out using R version 4.3.0 (R Core Team, 2023) and several R packages, including “mice” for multiple imputation (van Buuren and Groothuis-Oudshoorn, 2011) and “lme4” for the linear mixed model (Bates et al., 2015).

2.10. Ethics

Ethical approval was granted by Melbourne Health Human Research Ethics Committee (HREC/56912/MH-2020) and Australian Catholic University Human Research Ethics Committee (2020-127RC), including consent implied by survey completion. The trial was registered on the Australian and New Zealand Clinical Trials Registry (registration number: ACTRN12620001052921) on 15th October 2020, with first recruitment on 4th February 2021.

3. Results

3.1. Participants

The participant flowchart is presented in Fig. 1. A total of 144 mental health nurses completed the T1 survey and were randomised to the intervention ($n = 73$) or control ($n = 71$) group. Participant demographics and baseline (T1) characteristics by intervention and control groups are presented in Table 1. Twelve participants from the intervention group withdrew during the study, and 10 ($n = 8$ intervention, $n = 2$ control) were lost to follow-up, resulting in a final study sample of 122 participants. The Promoting Resilience in Nurses programme was delivered to a total of seven groups, with group size varying from seven to thirteen.

3.2. Intervention outcomes

For each outcome, Table 2 shows the estimate and 95 % Confidence Intervals. The size of the intervention effect needs to be interpreted in the context of the units and scale of the outcome.

The estimated treatment effect (intervention minus control) for coping self-efficacy was 21.2 units at T2 (95% CI: 13.3 to 29.0, $p < 0.001$) and 12.1 units at T3 (95% CI: 4.7 to 19.6, $p = 0.002$). To interpret this result, the short version CSES scale has 13 items, each scored 0 to 10. These improvements therefore correspond to 1.6 points (T2) and 1.0 point (T3) per question on average. These are substantial effects.

The estimated intervention effects are large and important, favouring intervention, for psychological distress, wellbeing, resilience, posttraumatic growth at both T2 and T3; Emotional intelligence behaviour was statistically significant at T2 only and workplace belonging statistically significant at T3. Generally, the T3 estimates tended to be slightly smaller than the T2 estimates, with psychological distress, resilience and workplace belonging sustained over time (see Table 2). Turnover intention did not show a statistically significant effect at either time point.

3.3. Complete case analysis

The complete case results were not very different from the multiple imputation results, generally, taking into account the precision of estimates (Supplemental material Table 1). Notably, the complete case treatment effects for the primary outcome CSES were 20.9 (T2) and 12.2 (T3), almost the same as the multiple imputation results.

3.4. Programme fidelity

Fidelity checklists indicated programme delivery as follows: of the 161 content units delivered (i.e., 23 content units in the programme delivered to seven groups), 153 units (95 %) were fully delivered, 7 units (4.4 %) were partially delivered, and 1 unit (0.6 %) was not delivered.

4. Discussion

This study presents the first randomised control trial evaluation of a resilience intervention with mental health nurses that demonstrates statistically significant and clinically meaningful results. Key findings were that coping self-efficacy (primary outcome) improved after the programme, with improvements sustained for three months. Psychological distress decreased, while wellbeing, resilience, posttraumatic growth improved and were sustained at 3 months. Emotional intelligence behaviours improved initially (T2) and workplace belonging improved at 3-month follow-up. Overall, this trial indicates the Promoting Resilience in Nursing programme was effective in achieving programme aims of promoting self-efficacy to cope with stress, increasing mental health nurses' mental health, wellbeing and resilience, promoting post-traumatic growth, and regulating emotions in the context of stress and adversity. The programme also promoted a sense of workplace belonging. These are notable findings in the context of the extraordinary challenges to staff that occurred during the trial due to the COVID-19 pandemic and extended lockdowns in Melbourne, combined with the structural disaggregation of the health service. These went beyond the everyday stressors of their work. As Kunzler et al. (2022) identify in their review and meta-analysis of resilience interventions with nurses prior to COVID-19, pre-pandemic interventions may not be impactful during public health crises, and the findings from resilience

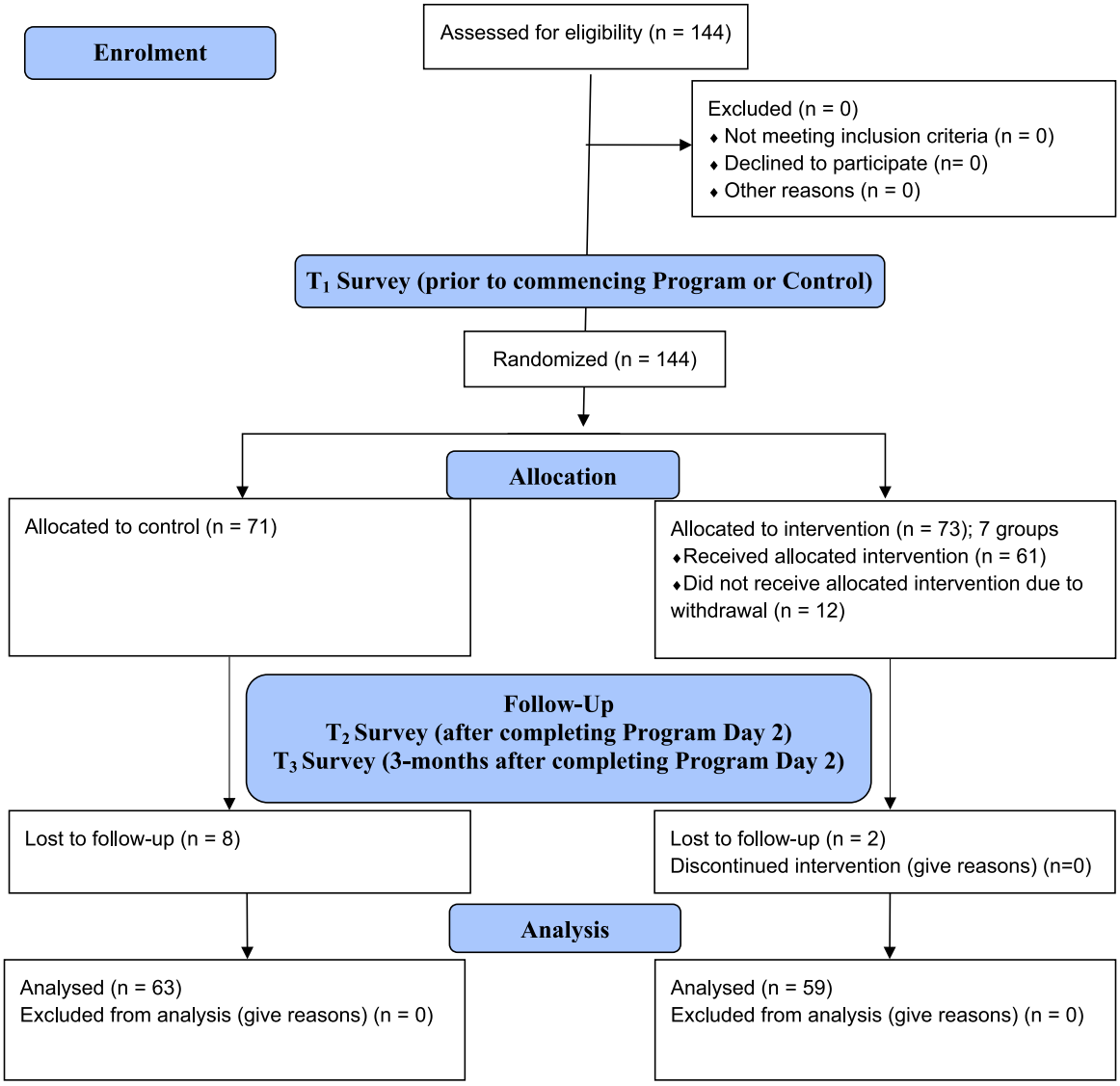

Fig. 1. CONSORT 2010 flow diagram.
Note: Lost to follow-up are participants who completed Time 1 survey but did not complete both Time 2 and Time 3 surveys. Analysis numbers for complete cases' analysis.

interventions such as this that were implemented during COVID-19 provide vital further insights into the efficacy of these interventions.

The statistically significant improvement in coping self-efficacy (primary outcome) in the programme group is consistent with the pilot results of the antecedent Promoting Adult Resilience programme with mental health nurses (Foster et al., 2018a) and with some other trials in the wider nursing field (Kunzler et al., 2022) that have reported improved self-efficacy at 3-month follow-up (Berger and Gelkopf, 2011; Bernburg et al., 2019). Having a personal belief in their ability to deal with challenging circumstances is an important resilience-promoting factor for mental health nurses' wellbeing and to support their interpersonal practice.

We also found statistically significant reductions in mental distress (using the K10), sustained at 3 months. This is a key finding. There are no direct comparisons to be made as other nursing studies have used different measures for mental distress (e.g., DASS-21) but Kunzler et al. (2022) in their review and meta-analysis found no effect of resilience interventions on depressive symptoms at post-test or within 3 months, and no effect on anxiety or stress at post-test, but moderate effects for both within 3 months. Our findings showed substantial benefits and were statistically significant over both time points and have important implications in respect to the benefits the Promoting Resilience in Nurses programme can have on reducing mental distress for nurses. Prior studies have reported the poor mental health of mental health nurses (Foster et al., 2021; Delgado et al., 2021) and mental distress is a known factor in nursing workforce attrition and reduced quality of practice (Adams et al., 2021; Chew et al., 2023; Cranage and Foster, 2022; Foster et al., 2024a).

Wellbeing was a further statistically significant finding sustained at 3 months, which is generally consistent with Kunzler et al.'s (2022) meta-analysis that illustrated a moderate effect post-intervention and small effect for wellbeing at 3 months across studies. Our findings do contrast with Henshall et al.'s (2023) trial, which did not demonstrate statistically significant differences in wellbeing (Warwick Edinburgh Wellbeing Scale) between intervention and control groups at 6 weeks. Positive wellbeing is a key outcome indicating a resilient process (McLarnon and Rothstein, 2013) and a valuable finding for nurses as the absence of mental distress is not necessarily an indicator of positive mental health (Westerhof and Keyes, 2010). In this study, there was both reduction of distress and improvement in mental health as indicated by the wellbeing results. There was also statistically significant improvement in emotional intelligence behaviours post intervention, which was not sustained at 3 months (although completed case analysis indicated statistically significant improvement at 3 months). Exploring

Table 1
Demographic characteristics by cluster and individual, and baseline (Time 1) scores for primary and secondary outcomes

Demographic characteristics	Intervention, $n = 73$ $n = 7$ groups/clusters	Control, $n = 71$ No clusters
Cluster	Mean (SD)	Mean (SD)
Number per cluster	10.43 (2.57)	N/A
Age (years)	35.42 (4.97)	N/A
Years mental health nursing	6.16 (5.99)	N/A
Individual	n (%)	n (%)
Gender		
Male	19 (26 %)	20 (28 %)
Female	54 (74 %)	50 (70 %)
Non-binary	0 (0 %)	1 (1.4 %)
Age group (years)		
20 to 29	25 (37 %)	17 (25 %)
30 to 39	22 (32 %)	26 (39 %)
40 to 49	13 (19 %)	9 (13 %)
50 +	8 (12 %)	15 (22 %)
Unknown	5	4
Professional role		
Enrolled nurse	7 (9.6 %)	12 (17 %)
Registered nurse (RN)	66 (90 %)	59 (83 %)
Years in mental health nursing		
<1	22 (31 %)	18 (27 %)
1 to 5	29 (41 %)	30 (45 %)
6 to 10	9 (13 %)	7 (10 %)
11 to 20	5 (7 %)	9 (13 %)
>20	5 (7 %)	3 (5 %)
Unknown	3	4
For RNs ($n = 125$), post-graduate qualification in mental health		
Yes	33 (50 %)	28 (47 %)
No	33 (50 %)	31 (53 %)
Baseline measure	Mean (SD)	Mean (SD)
Coping self-efficacy[a]	82.3 (20.4)	82.1 (21.6)
Psychological distress	20.3 (6.7)	20.1 (6.1)
Wellbeing	46.7 (12.4)	49.3 (12.0)
Resilience	3.37 (0.66)	3.54 (0.74)
Posttraumatic growth	62.4 (20.8)	59.7 (21.9)
Emotional regulation	53.9 (6.9)	53.9 (6.7)
Workplace belonging	3.61 (0.80)	3.55 (0.83)
Turnover intention	7.6 (3.5)	8.3 (3.9)

Note: Time 1, baseline; measures completed prior to randomisation to intervention or control group. SD, standard deviation.
[a] Coping self-efficacy primary outcome. Missing data for baseline measures varied between 0 and 2, except for Posttraumatic Growth: $n = 23$ (intervention) and $n = 21$ (control).

the impact of the Promoting Resilience in Nurses programme on mental health nurses' emotional intelligence behaviours at work using the GENOS-EI measure was novel and there are no prior reports using this measure with mental health nurses. Of the nine strongest resilience interventions for nurses identified by Kunzler et al. (2022), it is relevant to note that emotion regulation strategies were delivered in five. Emotional intelligence is positively associated with mental health (Ruiz-Aranda et al., 2012) and wellbeing (Sánchez-Álvarez et al., 2015) and is a key aspect of resilience (Foster and Robinson, 2014). Having the capacity to emotionally regulate is also recognised as a contributing factor in nurses' ability to manage stressors (Halter et al., 2017). Emotional intelligence behaviours are essential capacities that mental health nurses draw on in their interpersonal practice when engaging with distressed others (e.g., consumers and carers). In respect to future intervention research, we recommend that emotional intelligence measures are included with this workforce.

Resilience demonstrated statistically significant improvements over both time points, with a larger effect at 3-month follow-up than immediately after the intervention. This is a new finding and the first trial to demonstrate sustained improvement in mental health nurses' resilience

Table 2
Estimates and 95 % confidence intervals for outcomes, expressed as intervention minus control.

Primary and secondary outcomes	Time 2 (N = 144, after the programme)		Time 3 (N = 144, 3 months after programme)	
	Estimate and 95 % CIs	P	Estimate and 95 % CIs	P
Coping self-efficacy[a]	21.2 (13.3 to 29.0)	<0.0001	12.1 (4.7 to 19.6)	0.002
Psychological distress[b]	−3.7 (−6.2 to −1.3)	0.004	−4.2 (−6.7 to −1.8)	0.001
Wellbeing	9.2 (5.0 to 13.4)	0.0001	7.6 (3.7 to 11.4)	0.0003
Resilience	0.24 (0.01 to 0.46)	0.040	0.30 (0.08 to 0.52)	0.009
Posttraumatic growth	16.1 (7.0 to 25.3)	0.001	8.9 (0.6 to 17.2)	0.035
Emotional intelligence behaviours	3.5 (0.6 to 6.5)	0.020	2.3 (−0.4 to 5.0)	0.093
Workplace belonging	0.25 (−0.07 to 0.58)	0.119	0.34 (0.02 to 0.65)	0.036
Turnover intention[b]	−0.65 (−2.22 to 0.91)	0.406	0.17 (−1.36 to 1.71)	0.822

Notes: Results for multiple imputation analysis. Table for complete cases analysis in Supplemental.
[a] Primary outcome.
[b] For psychological distress (K10) and turnover intention (TIS), higher values indicate lower wellbeing and lower retention, hence negative estimates favour intervention.

following a resilience intervention. Kunzler et al.'s (2022) meta-analysis found that post-intervention effects for resilience were not sustained over time across studies (≤3-months). Henshall et al.'s (2020) pilot study showed statistically significant improvement in nurses' resilience post-intervention using a single item "How would you rate your current level of resilience?", but not with the Brief Resilience Scale (BRS also used in the current study) at 6-weeks in their pilot trial (Henshall et al., 2023). In the Promoting Adult Resilience pilot (Foster et al., 2018a), the 60 item Workplace Resilience Inventory was used, which identified statistically non-significant but clinically meaningful improvements in behavioural and cognitive self-regulation post intervention.

There were also sustained improvements in post-traumatic growth 3 months following the intervention. This is another substantial and meaningful finding, particularly given the context of the trial being conducted during the pandemic, which has been recognised as a traumatic event with increased potential for mental distress (Kaubisch et al., 2022). Although there are no direct comparisons to be made with intervention studies with this population, these findings are generally consistent with those of Wang et al. (2023) in their meta-analysis of post-traumatic growth, who found nurses on the COVID frontline had the highest levels of PTG, followed by mental health nurses.

The Promoting Resilience in Nursing programme did not significantly influence work-related outcomes of workplace belonging directly after the intervention (although statistically significant improvement was identified at both time points in the completed case analysis), and no improvements were identified for turnover intention. It is relevant to note that turnover intention overall was low at T1 (Foster et al., 2024b). Despite the trial being conducted during a period of substantial change and trauma affecting nurses (COVID-19 pandemic and structural disaggregation), the improvement in workplace belonging at 3-month follow-up is notable. Both COVID-19 and disaggregation are highly likely to have affected nurses' sense of belonging to their workplace, and their intention to leave. Internationally, turnover rates of nurses increased during the COVID-19 pandemic, and low job control, higher workload and longer hours, and job stress and job insecurity were associated with higher turnover (Tolksdorf et al., 2022). Previous research has also identified that hospital system changes such as restructures can be detrimental to nurses' wellbeing (Lee et al., 2015), and are associated with increased nursing workload and stress levels, and decreased job satisfaction and professional efficacy (Greenglass and Burke, 2001). Exploring the relationships between nurses' mental health and wellbeing, emotional regulation, and workplace belonging and turnover intention is outside the scope of this trial. For future research, such relationships could identify potential moderator effects of individual (e.g., age, gender) or professional (e.g., years of experience) factors on these work-related outcomes.

In summary, the trial results indicate that the programme was effective in achieving its stated aims, and it is likely that turnover intention was affected by the impacts of the COVID-19 pandemic and structural disaggregation in the health service. The current setting was public mental health, but the Promoting Resilience in Nurses programme could be suitable for the wider nursing and health practitioner workforces with some minor modifications. It is recommended that future health service policy includes resilience interventions being provided for transition programmes for graduates and other nurses newly transitioning into mental health, and for nurses assuming clinical leadership roles or managers, who can often be left out of professional development opportunities. We also recommend that supporting staff wellbeing through resilience programmes is important for future organisational change. In respect to health service policy, when hospitals are restructuring, for example, we recommend that additional support is required for nurses (Lee et al., 2015). In respect to practice and research, further trials of the Promoting Resilience in Nurses programme and its efficacy in other contexts would help extend the evidence-base through longer term follow-up (e.g., at 6 and 9 months) (as per Kunzler et al.'s, 2022 recommendation). The programme could include refresher or booster sessions to reinforce nurses' skills at 6 months. These refreshers could be facilitated online given the acceptability and feasibility of some other online resilience strategies (Henshall et al., 2023). Future research could also consider the potential cost-effectiveness of delivering the programme (e.g., reduced absenteeism or turnover) and potential moderator effects (e.g., years of clinical experience).

4.1. Limitations

Despite the strengths of the study, including the randomised control trial design, and the evidence-based intervention tailored specifically for mental health nursing, there are some limitations to be considered. Due to government lockdowns for COVID-19, the data collection period was affected which limited the sample size. Nevertheless, the benefits from the programme for the primary outcome measure were substantial and greater than those expected in the design phase. The sample comprised mental health nurses in one public mental health setting, and the findings may not necessarily be generalisable to other settings. Participation was voluntary, and subject to self-selection bias. Those nurses experiencing high stress levels or who were interested in improving their resilience within the stressful circumstances may have been more likely to participate. A substantial proportion of data were missing for the posttraumatic growth inventory, which may have been due to being the last measure in the survey. The follow-up timeline was also relatively limited and subsequent research on the maintenance of the positive effects over a longer period of time is needed.

5. Conclusion

The current study is the first to demonstrate that the Promoting Resilience in Nurses programme can help improve mental health, wellbeing and resilience, and increase efficacy to manage stress, regulate emotions and experience posttraumatic growth in the context of adversity for mental health nurses. These capacities are critical for nurses' wellbeing and have implications for effective clinical practice in delivering healthcare within complex, demanding environments. This intervention was found to be appropriate for mental health nurses and could be tailored for other nursing and healthcare workforce populations as needed. At a time when attrition of the nursing workforce is projected to grow, evidence-based strategies to offset work-related stressors and support staff wellbeing are needed.

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CRediT authorship contribution statement

Kim Foster: Writing – original draft, Visualization, Resources, Project administration, Methodology, Investigation, Funding acquisition, Conceptualization. **Ian Shochet:** Writing – review & editing, Methodology, Funding acquisition, Conceptualization. **Jane Shakespeare-Finch:** Writing – review & editing, Funding acquisition, Conceptualization. **Darryl Maybery:** Writing – review & editing, Methodology, Funding acquisition, Conceptualization. **Minh Viet Bui:** Writing – review & editing, Project administration, Investigation, Data curation. **Ian Gordon:** Writing – original draft, Formal analysis. **Kathleen L. Bagot:** Writing – original

draft. **Michael Roche:** Writing – review & editing, Methodology, Funding acquisition, Conceptualization.

Data availability

The raw data supporting the conclusions of this article will be made available by the authors upon reasonable request. All publications from the research will be openly accessible. For those interested in further details about the Promoting Resilience in Nursing (PRiN)© programme, please contact Prof Ian Shochet, i.shochet@qut.edu.au

Declaration of Competing Interest

The Institutes of authors KF, IS, JSF, DM and MR received funding as outlined in Funding. Funding bodies had no role in the design, conduct or write-up of the trial. IS and JSF are the programme developers and were involved in study conception, design and conduct but had no role in the trial analysis. MVB, IG, and KB declare no competing interests.

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