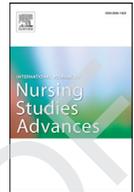




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An online mindfulness intervention to enhance compassion in nursing practice: A feasibility and acceptability study with nursing students

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ABSTRACT

Background: Compassion is an important component of nursing care, but public enquiries into care failures have noted that it is not always evident. Mindfulness interventions have the potential to support compassion. However, the feasibility of delivering a mindfulness intervention at scale to nursing students has not been established.

Objectives: To develop and test the feasibility and acceptability of a tailored mindfulness based online intervention to foster compassion in nursing students within clinical practice.

Design: A randomised feasibility study with a waiting list control.

Setting: A UK nursing faculty within a large university.

Participants: Post-graduate, post-registration and pre-registration nursing students ($N = 77$).

Methods: An online five module mindfulness based intervention (Mindful Nursing Online) was developed and tailored to support compassion in clinical nursing. The feasibility study comprised 77 participants randomised in a 2:1 ratio into an immediate access group (intervention, $n = 50$) or a delayed access group (waiting list control, $n = 27$). Data on feasibility through completion, attrition and practice rates, were collected through follow-up questionnaires at post-intervention, and 14 and 20 weeks after baseline. Acceptability data was collected through semi-structured interviews with 12 participants.

Results: Non-completion rates were high with all five modules completed by only 28% ($n = 14$) of participants, and three modules completed by only 46% ($n = 23$). The most commonly cited reason for non-completion was lack of time. However, the interview data suggested those who completed the intervention were using mindfulness techniques in practice. They described feeling less stressed on the ward, having an increased focus on patients and a greater appreciation of the importance of self-care. Evaluative feedback therefore showed that the intervention was perceived to be effective at promoting mindfulness skills and was relevant to nursing work.

Conclusion: Minimising attrition and enhancing engagement with the intervention should be the key objectives of a future study. Feedback from participants who completed the intervention indicates that a brief mindfulness intervention delivered online may support the delivery of compassionate nursing care.

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1 What is already known about the topic?

- 2 • There are a number of factors which can hinder compassion in healthcare, and which reflect the challenging nature of the role
- 3 and workplace pressures.
- 4 • There has been only limited research to develop and evaluate educational interventions which support compassionate nursing
- 5 care within the realities of clinical practice.

6 What this paper adds

- 7 • A mindfulness-based intervention tailored to nursing practice is a promising way of supporting compassion and addressing factors
- 8 which undermine compassion in daily practice.
- 9 • Using online delivery offers flexibility in training and can increase nursing students' access to learning mindfulness techniques.
- 10 • There is a need for further research to determine how to maximise nursing students' engagement in and completion of online
- 11 mindfulness interventions.

12 1. Introduction

13 Empirical evidence suggests that compassionate care can improve patient experience and increase the likelihood of better patient
 14 outcomes (Post, 2011; van der Cingel, 2011). Compassion is also considered a central tenet of nursing care (Chambers and Ryder,
 15 2009). However, high profile care failures suggest that compassionate care does not always occur (Francis, 2013). Indeed, there have
 16 been several campaigns and policy initiatives internationally to promote the importance of compassion within healthcare in the US
 17 (Lown, Rosen, and Marttila, 2011), New Zealand (Youngson, 2012) and the UK (Cummings and Bennett, 2012; Francis, 2013). Such
 18 campaigns have had a mixed response from staff; for example, in the UK, whilst many of the values and aims within the "Compassion
 19 in Practice" strategy (Cummings and Bennett, 2012) have been successfully implemented across services, some nurses appear sceptical
 20 of the largely top-down approach of the campaign and of its failure to recognise the considerable organisational barriers to providing
 21 compassion in practice (Serrant et al., 2016, Driscoll et al., 2018)

22 Multiple factors appear to hinder the delivery of compassionate care in healthcare settings. Low staffing levels can limit nurses'
 23 ability to dedicate time to creating rapport and trust with patients (Ball et al., 2014). Some healthcare delivery settings have an
 24 excessive focus on performance and financial targets, which can lead staff to feel that they themselves are not treated by their
 25 organisation in a compassionate way. This focus can increase workers' stress and can be to the detriment of patient care (Cole-
 26 King and Gilbert, 2011; Firth-Cozens and Cornwell, 2009). Caring itself can have a psychological impact on professionals which
 27 can also hamper compassionate responding. Witnessing suffering on a continual basis can lead to stress-related syndromes such as
 28 burnout or compassion fatigue (Figley, 1995; Maslach and Goldberg, 1998; Peters, 2018). Similarly, unsupported, the emotional
 29 labour to regulate nurses' own negative emotions in practice can lead to exhaustion (Delgado, Upton, Ranse, Furness, and Foster,
 30 2017; Hochschild, 1983).

31 In terms of interventions for healthcare professionals, Blomberg, Griffiths, Wengstrom, May, and Bridges (2016) reviewed 25
 32 compassionate nursing interventions and concluded through narrative synthesis that most studies showed significant benefits of
 33 the interventions in relation to the outcomes measured. A review by Durkin, Gurbutt, and J. (2018) of teaching compassion to
 34 nursing students found only two such teaching interventions. A wider scoping review by Sinclair et al. (2016) of the compassion
 35 literature included a description of ten interventions to promote compassion to others (and self) in healthcare professionals and
 36 students. The reviews identified a range of interventions which were mostly face-to-face, and included evaluations of role-play,
 37 communication training, journaling, simulations, new models of care and mindfulness. Blomberg et al. (2016) referred to the low
 38 quality of most of these studies which were not replicable, often quasi-experimental and lacked theoretical frameworks. Sinclair et al.
 39 (2016) recommended that compassion training should be individualised to students and their existing qualities through a process of
 40 reflexive and experiential learning.

41 Given the emotional and practical resources required to deliver compassionate care (Tierney, Bivins, and Seers, 2018) mindfulness
 42 may be a promising intervention for supporting staff working in challenging organisational environments. Marlatt and Kristeller (1999,
 43 p68) describe mindfulness as a way of attention training, of "bringing one's complete attention to the present experience on a moment
 44 to moment basis." Although there are a number of mindfulness models which propose different mechanisms of action, most share
 45 the concepts of enhancing attention, increasing self-awareness, de-centring (changing how we view our thoughts) and improving
 46 emotional regulation (Bishop et al., 2004; Hölzel et al., 2011; Shapiro, Carlson, Astin, and Freedman, 2006). Meta-analyses have
 47 suggested that regular practice of mindfulness, largely through meditation, has positive effects in terms of reducing stress, depression
 48 and anxiety (Demarzo et al., 2015; Goyal et al., 2014; Kuyken et al., 2016). Reviews of mindfulness intervention studies with nurses
 49 and nursing students have also confirmed that it can reduce their stress and anxiety (Botha, Gwin, and C., 2015; Smith, 2014; Van
 50 Der Riet, Levett-Jones, and Aquino-Russell, 2018). There is also a limited amount of research which suggests that mindfulness may
 51 increase empathy and focus on patient-centred outcomes in healthcare staff and students (Barbosa et al., 2013; Irving, Dobkin, and
 52 Park, 2009; Krasner et al., 2009; Shapiro and Schwartz, 1998).

53 Although the exact mechanism by which mindfulness fosters empathy and compassion is unclear, the literature suggests at least
 54 five hypothetical pathways through which mindfulness could foster compassion in nursing practice. Additional pathways might be
 55 identified, but those listed below provided the conceptual and mechanistic rationale behind the intervention described in this paper.
 56 A mindfulness intervention could support compassionate practice by:

Table 1
Intervention content by module.

Title	Nursing challenge	Objective	Formal and informal practices
Module 1: Introduction	Nursing on autopilot	Orientate nurses to the practice of mindfulness	Body scan Mindful Hand washing
Module 2: Focusing attention & awareness	Multi-tasking in nursing and interruptions	Promote greater awareness in practice to noticing suffering and how to respond effectively	Body Scan Mindful walking at work and other work-based examples STOP (Stop, Take a breath, Observe, Proceed) or Pause practice
Module 3: Stress!	Stress of nursing: both organisational and personal challenges	Focus on stress reduction (emotional regulation) to allow more compassionate responding to occur	Body and Breath Meditation Three minute-breathing space and other work-based examples
Module 4: Being with distress	Emotional overload of nursing role	Foster the ability to tolerate difficult or negative emotions to provide compassion without being overwhelmed	Sitting meditation (Sounds and thoughts) Mindful movement with work-based examples
Module 5: A Compassionate approach	Trying to deliver compassionate care	Promote self-compassion and self-care) and generate motivation for compassion to others	Loving Kindness Meditation Self-compassion breaks at work Gratitude practice

- 57 1) Increasing awareness in the practice setting which could improve professionals' awareness of and sensitivity towards what patients
58 need in busy environments (Hölzel et al., 2011, Youngson, 2011);
59 2) Increasing empathy through a greater awareness of ones' own emotions, which is thought to be a precursor to compassion (Block-
60 Lerner, Adair, Plumb, Rhatigan, and Orsillo, 2007);
61 3) Strengthening motivation to be compassionate to others, through mindfulness and compassion enhancing meditative practices
62 (Gilbert et al., 2009; Leiberg, Klimecki, and Singer, 2011);
63 4) Supporting self-compassion leading to a more optimistic appraisal of one's own resources, and a recognition of the commonality
64 of human suffering (Cole-King and Gilbert, 2011; Neff et al., 2013);
65 5) Improving emotional regulation, and thus lowering stress levels known to have a negative impact on empathy and compassion
66 (Firth-Cozens and Cornwell, 2009).

67 Previous research with healthcare professionals (Beddoe and Murphy, 2004; Cohen-Katz, Wiley, Capuano, Baker, and Shapiro,
68 2004; Shapiro, Astin, Bishop, and Cordova, 2005; Van Der Riet, Rossiter, Kirby, Dluzewska, and Harmon, 2015) suggests that attrition
69 from mindfulness courses is an issue. Staff generally report insufficient time to attend sessions. Most standard courses usually last at
70 least 26 h over a period of eight weeks (Kabat-Zinn, 1982). However, research suggests that mindfulness-based programmes can be
71 abbreviated without reducing their effects on measures of physical and psychological health (Carmody and Baer, 2009; Cavanagh
72 et al., 2013; Gilmartin et al., 2017). Online delivery may solve the problem of erratic attendance of nursing students and healthcare
73 professionals at face-to-face mindfulness sessions. Despite this potential, the use of online methods to deliver mindfulness training to
74 nursing students has rarely been explored.

75 The objectives of the randomised, mixed methods evaluation study reported in this paper were to investigate: 1) the feasibility
76 of delivering the online intervention; 2) its acceptability to nursing students; and 3) the feasibility of the trial design and outcome
77 measures to inform a further effectiveness trial.

78 2. Methods

79 2.1. Development and description of the intervention

80 The intervention was developed using the Medical Research Council Framework (Craig et al., 2008) which provides a systematic
81 approach to developing complex interventions. It was developed by a team comprising a researcher, a mental health nurse, and
82 experts who were qualified to teach mindfulness within the NHS and higher education settings (SC, IN, MC and RLG). As part of
83 the development process, stakeholders' views on appropriate content were also gathered through a small focus group with post-
84 registration nursing students ($n=5$) and further consultation with nursing academics. The usability of the first prototype was tested
85 with a sample of qualified nurses and nursing students ($n=6$), and a final version was developed incorporating this feedback. The
86 intervention was developed using LifeGuide, a software initiative funded by the Economic and Social Research Council (UK) to
87 develop interactive online healthcare interventions.

88 Table 1 and the accompanying description below is guided by the template for intervention description and replication checklist
89 (TiDieR) (Hoffmann et al., 2014). All five of the modules comprised didactic information on compassion and mindfulness, and each
90 was framed by common challenges in nursing. This was to increase salience and provide practical approaches to implementing mind-
91 fulness into nursing practice. Table 1 shows the informal mindfulness practices which were suggested. These were brief meditations
92 which could be done as part of the working day. For example, participants were advised to use STOP and take a mindful pause when
93 going to the pharmacy, or before entering a patient's room. Formal practices comprised longer guided meditations lasting between

94 10 and 20 min. For these, participants were directed, with permission, to a website associated with a self-help mindfulness book,
95 "Finding Peace in a Frantic World" (Williams and Penman, 2011) which provides free, downloadable meditation files.

96 Each module took between 30 and 60 min to complete and was released on a weekly basis. Participants accessed the modules one
97 to five sequentially, and were unable to access the next module until they had completed the previous one. They were always able
98 to review previously studied modules. They were able to email mindfulness experts with practice questions or an administrator for
99 technical issues. There was also the opportunity to join a peer support forum to connect to other participants. Each module ended
100 with a resources page of links to academic papers, news articles and relevant videos on the internet to support module learning.
101 Standardised emails were sent on module completion, when a new module became available, and as a reminder to access a module or
102 complete follow up assessments. Participants were also emailed weekly with motivational tips. Each module contained a frequently
103 asked questions page on practice itself (e.g. becoming distracted or getting bored) and a list of common barriers to practising (e.g.
104 finding time and losing motivation) and how to overcome them.

105 2.2. Evaluation of the intervention: Study design and data collection procedures

106 The intervention was tested for feasibility using a randomised design, featuring a wait list control, with a 2:1 randomisation bias
107 to ensure that sufficient numbers were randomised to the intervention group to provide feedback. Participants registered online and
108 then completed baseline data. They were then randomised automatically and informed about their allocation through the intervention
109 software, which was followed later by a confirmatory email. Participants in the delayed access group (waiting list control) were given
110 access to the intervention at the end of the study at 20 weeks. Participants were recommended to complete the intervention within 8
111 weeks but could access it after this time and up until the end of the study. Ethical approval was obtained from the university's ethics
112 committee prior to the development and testing of the intervention (PNM:HR-15/16-273).

113 2.3. Participants

114 Participants were eligible if they were either second or third-year pre-registration nursing students or post-registration students.
115 There were no exclusion criteria for second and third year students. First year students were excluded as they were not considered to
116 have enough clinical experience to make use of the techniques in practice. Although the intervention was developed as an introduction
117 to mindfulness, students with previous mindfulness experience were still eligible to participate. Recruitment lasted six months via
118 information posted on student online learning boards and posters within the Faculty. Participants were informed that the study was
119 an independent research project and that choosing to participate or not would have no effect on their studies. Participants in the
120 immediate access and delayed access groups who completed their final follow up evaluations were offered £10 and £5 vouchers
121 respectively. Completion certificates were sent to those who completed module five, and interviewees were offered a £10 voucher for
122 their time. Although not powered, the target sample size for the evaluation study was 90, assuming a high attrition rate of up to 50%.
123 This was informed by previous high dropout rates in studies of online mindfulness interventions (Cavanagh et al., 2013). Even with
124 this level of dropout, there would be sufficient numbers in each group for the purposes of testing the feasibility and acceptability of
125 the intervention (Julious, 2005).

126 2.4. Evaluating the feasibility of the intervention

127 2.4.1. Completion rates

128 Data were collected on the percentage of people who: 1) did not begin the first module; 2) completed five modules by the end of
129 the study period; and 3) completed three or more modules by the end of the study period. Participants who completed at least three
130 of the five modules were considered to have had sufficient exposure to the intervention (or dose) which is akin to the threshold of
131 50% (or four out of eight sessions) set by previous mindfulness studies (Crane and Williams, 2010; Dimidjian et al., 2014; Kuyken
132 et al., 2010).

133 2.4.2. Practice rates

134 Data on the amount of practice (formal and informal) which occurred during the previous week. This was collected through
135 participant self-rating at the beginning of each new module, and at 14 and 20 weeks follow up. At each timepoint, participants
136 were asked how many days per week they carried out both formal and informal practice (not at all, one to two days, three or four
137 days, or more than four days). As research suggests that practising mindfulness for at least three days per week can have an impact
138 on psychological outcomes (Crane et al., 2014; Perich, Manicavasagar, Mitchell, and Ball, 2013) participants were subsequently
139 categorised into those reporting either moderate to high practice (three days per week or more) or low practice (fewer than three
140 days) at each of the time points.

141 2.5. Evaluating the feasibility of the trial design/measures

142 The feasibility of the trial design was established through collecting data on the number of: 1) registering participants who wanted
143 to be allocated to the particular groups (immediate or delayed access) at allocation; 2) control participants who engaged in mindfulness
144 practices whilst waiting for the intervention, which could underestimate effect sizes in a future trial; 3) control participants accessing
145 the intervention after 20 weeks to determine potential data loss from this group in an effectiveness trial and 4) The percentage of

146 people providing follow up outcome data post-intervention (either after the final module, or at eight weeks if the intervention was not
147 completed by then) and at 14 weeks and 20 weeks after registration. In addition, several possible psychological outcome measures
148 were selected for potential use in a future effectiveness trial. They were chosen either because they addressed direct outcomes of the
149 intervention (i.e. less fear of providing compassion for others) or the hypothesised pathways by which these direct outcomes might be
150 achieved (i.e. greater mindfulness, reduced stress, increased empathy, increased compassion satisfaction, and increased compassion
151 for self). Thus, they all had potential for use as primary and secondary outcome measures in a later effectiveness study.

152 2.6. Fear of compassion for others scales (FCS) (Gilbert, McEwan, Matos, and Rivis, 2011)

153 As part of their work with clinical populations, Gilbert et al. (2011) developed three scales to measure a person's tendency to resist
154 engagement in compassionate behaviour towards others and oneself due to fear of personal consequences (e.g. stress, guilt or burden).
155 The FCS comprises three sub-scales (*fear of expressing compassion to others*, *fear of expressing compassion to self* and *fear of receiving*
156 *compassion from others*). The *fear of expressing compassion to others* scale comprises ten items (e.g. "I worry that if I am compassionate,
157 vulnerable people can be drawn to me and drain my emotional resources). All items are rated on a five-point Likert scale from 0 to
158 4, with lower scores indicating that the respondent has a low fear of expressing compassion for others. A Cronbach's alpha of 0.78
159 was reported within student and therapist populations (Gilbert et al., 2011). The *fear of compassion for self* scale comprises 15 items
160 (e.g., "I feel that I don't deserve to be kind and forgiving to myself"). It has a minimum score of 0 and a maximum of 60 with lower
161 scores indicating that the respondent has a low fear of expressing compassion towards themselves. Gilbert et al. (2011) reported good
162 internal reliability with a Cronbach's alpha of 0.85 for this sub-scale.

163 2.7. Interpersonal reactivity index (IRI) (Davis, 1983)

164 The IRI (Davis, 1983) is a multi-dimensional measure of dispositional empathy comprising four, seven-item sub-scales which
165 can be used independently. Only the seven-item empathic concern sub-scale (EC) which measures the extent to which a person has
166 sympathy and compassion for others was used. The EC sub-scale comprises items such as, "I often have tender, concerned feelings
167 for people less fortunate than me." Overall scores for this sub-scale range from a minimum of 0 to a maximum of 28 indicating high
168 levels of empathy. Internal consistency of the IRI with Cronbach's alpha ranged from 0.70 to 0.78 (Yu and Kirk, 2009). Test-retest
169 reliabilities at 65–70 days ranged from 0.61 to 0.81 (Davis, 1983).

170 2.8. Mindfulness attention awareness scale (MAAS) (Brown and Ryan, 2003)

171 The *Mindfulness Attention Awareness Scale* (MAAS) conceptualises mindful awareness in everyday experiences as a state or char-
172 acteristic that varies between people and can be cultivated with practice. Typical statements are: "I find it difficult to stay focused
173 on what's happening in the present." It comprises ten questions on a six-point Likert scale. A mean score is calculated to provide a
174 scoring range of one to six, with higher scores indicating that a person tends to be more mindful. On original validation, the MAAS
175 had good internal consistency, with Cronbach's alpha of 0.82, and 4-week test-retest reliability of $r=0.81$ (Brown and Ryan, 2003).

176 2.9. Professional quality of life scale (ProQOL)(Stamm, 2010)

177 The ProQOL is a widely used measure of compassion fatigue and satisfaction. It is a 30-item self-report measure comprising three
178 discrete subscales: 1) compassion Satisfaction (pleasure derived from providing compassion); 2) burnout; and 3) secondary traumatic
179 stress (or compassion fatigue.) Respondents indicate how frequently they have experienced each item in the previous 30 days, on a
180 5-item Likert scale. Higher scores represent high levels of satisfaction, burnout and fatigue. The compassion satisfaction scale has a
181 Cronbach's alpha of 0.88, the burnout scale of 0.75, and the compassion fatigue scale of 0.81.

182 2.10. Perceived stress scale (PSS) (Cohen, Kamarck, and Mermelstein, 1983)

183 The Perceived Stress Scale (PSS) (Cohen et al., 1983) is a well validated and utilised ten item scale (Lee, 2012). The scale measures
184 the frequency of stress within individuals over the last month using a five-point Likert scale. The total score ranges from 10 to a
185 maximum of 40 which indicates high levels of stress. The PSS version 10 has good psychometric reliability with Cronbach's alpha of
186 0.78 reported (Cohen et al., 1983).

187 2.11. Acceptability of the intervention

188 Participants were asked to submit evaluations of each module. The evaluations were ad hoc measures developed by the authors
189 to fit the needs of the feasibility study in the absence of appropriate, validated acceptability measures. The questions were scored
190 using a Likert scale from 1 to 5 and are listed in Table 3. Open response options to provide more information relating to the ratings
191 were available for all items.

192 All participants were also offered the opportunity to be interviewed, either at the end of the final module if they completed this,
193 or alternatively at the end of the study. All participants who responded to the invitation were interviewed. Telephone interviews
194 were conducted by a member of the research team (SC). The interview schedule was constructed by the research team to answer

195 key questions of acceptability. It began by focusing on the acceptability of the intervention itself, including participants' motivation
196 and expectations when registering for the intervention. In the second part, questions focused on the acceptability of the mindfulness
197 practices, and any perceived impact of these. There was a clear distinction in the interview questions between the intervention itself
198 and mindfulness practices. It was possible that participants might be enthusiastic about mindfulness or the intervention as a learning
199 tool, without necessarily valuing both. The items were piloted for clarity and minor changes made. The final interview schedule can
200 be found in Appendix 1.

201 2.12. Data analysis

202 Descriptive statistics were used to examine the mean acceptability scores and the appropriateness of the psychological measures
203 by comparing baseline scores against normative values for nurses and other populations. The interview data were analysed using a
204 thematic analysis process outlined by Braun and Clarke (2006) due to its flexibility of being untied to a particular theoretical stance.
205 All interviews were transcribed by the researcher (SC) as the first stage of data familiarisation and transcriptions were imported into
206 NVIVO (version 11).

207 The analysis comprised five main stages: 1) familiarisation with the data which was achieved by transcribing and then re-reading
208 transcripts several times; 2) generation of initial codes to organise the dataset into meaningful groups; 3) identification of themes,
209 through locating different codes within broader themes, and then collation of all the relevant coded data extracts into these identified
210 themes; 4) a review of themes to check that the coded data reflected each theme and these themes reflected the overall meaning
211 of the dataset and finally 5) the naming of themes for further interpretative analysis, and an assessment of how they reflected the
212 narrative of the overall dataset. Initially, two transcripts were read and then coded using procedures 1–3. To ensure objectivity, the
213 preliminary coding scheme was discussed a second researcher (IJN), and after some discussion, the coding framework was revised.

214 3. Results

215 3.1. Sample

216 Eighty-six people registered for the intervention although only 77 completed randomisation. Fifty participants were randomised
217 to an immediate access group and 27 to a delayed access group. Overall, nearly two thirds of the sample (63.6%, $n=49$) were
218 between the ages of 18–30. The majority (90.9%, $n=70$) described themselves as female. The most frequent nursing speciality was
219 adult (general) nursing, followed by mental health and child health nursing. The largest proportion of students (70.1%, $n=54$)
220 were pre-registration, with the remainder describing themselves as qualified nurses studying for a postgraduate qualification. Most
221 participants (55.8%, $n=43$) had no previous experience of mindfulness, whilst 42.8% ($n=33$) had a little experience (e.g. reading
222 a pamphlet/book, looking at a video, etc.). Table 2. shows the characteristics of the participants who were randomised into each
223 group. However, since an effectiveness analysis was not planned, it was unnecessary to test for statistically significant differences in
224 baseline characteristics across the groups (Arain, Campbell, Cooper, and Lancaster, 2010).

225 3.2. Feasibility of the intervention

226 Eighteen percent ($n=9/50$) of those randomised to the intervention group never began the intervention. Twenty-eight percent
227 ($n=14/50$) of the total sample who were randomised completed all five modules, with 46.0% ($n=23/50$) completing at least three
228 modules. amongst the minority of participants (28.0%, $n=14/50$) who submitted reasons for non-completion, the most commonly
229 reported were insufficient time, breaking the continuity of practice, and the presence of competing events. See Fig. 1 for participant
230 flow through the study.

231 3.3. Practice rates

232 Between weeks one and two, 51.7% ($n=15/29$) of participants reported moderate to high formal practice and 68.9% ($n=20/29$)
233 practised informal techniques. Between weeks two and three, 43.5% ($n=10/23$) of participants practised formally at this level, with
234 60.9% ($n=14/23$) reporting moderate to high use of STOP (informal practice) and 65.2% ($n=15/23$) reporting this level of their own
235 selected informal practice. Between weeks three and four, 47.6% ($n=10/21$) reported moderate to high practice of formal techniques
236 and only 42.9% ($n=9/21$) used informal practices to this degree. In the final week, 64.3% ($n=9/14$) reported practising the sounds
237 and thoughts meditation at moderate to high frequency, and 57.1% ($n=8/14$) reported using the three-minute breathing space at
238 moderate to high frequency, whilst informal practice was undertaken by 64.3% ($n=9/14$). Practice data were submitted at the start
239 of each module before completion. Some participants submitted the practice log without completing the module, which accounts for
240 the occasional differences between these two totals.

241 3.4. Feasibility of study design/measures

242 When asked before randomisation about their allocation preferences, 51.2% ($n=44/86$) of the participants preferred to be placed
243 in the immediate access group, with only 4.7% ($n=4/86$) preferring the delayed group, and with 44.2% ($n=38/86$) expressing no
244 preference. 46.8% ($n=36/77$) of all participants completed the post-intervention measures (after the last module or at eight weeks

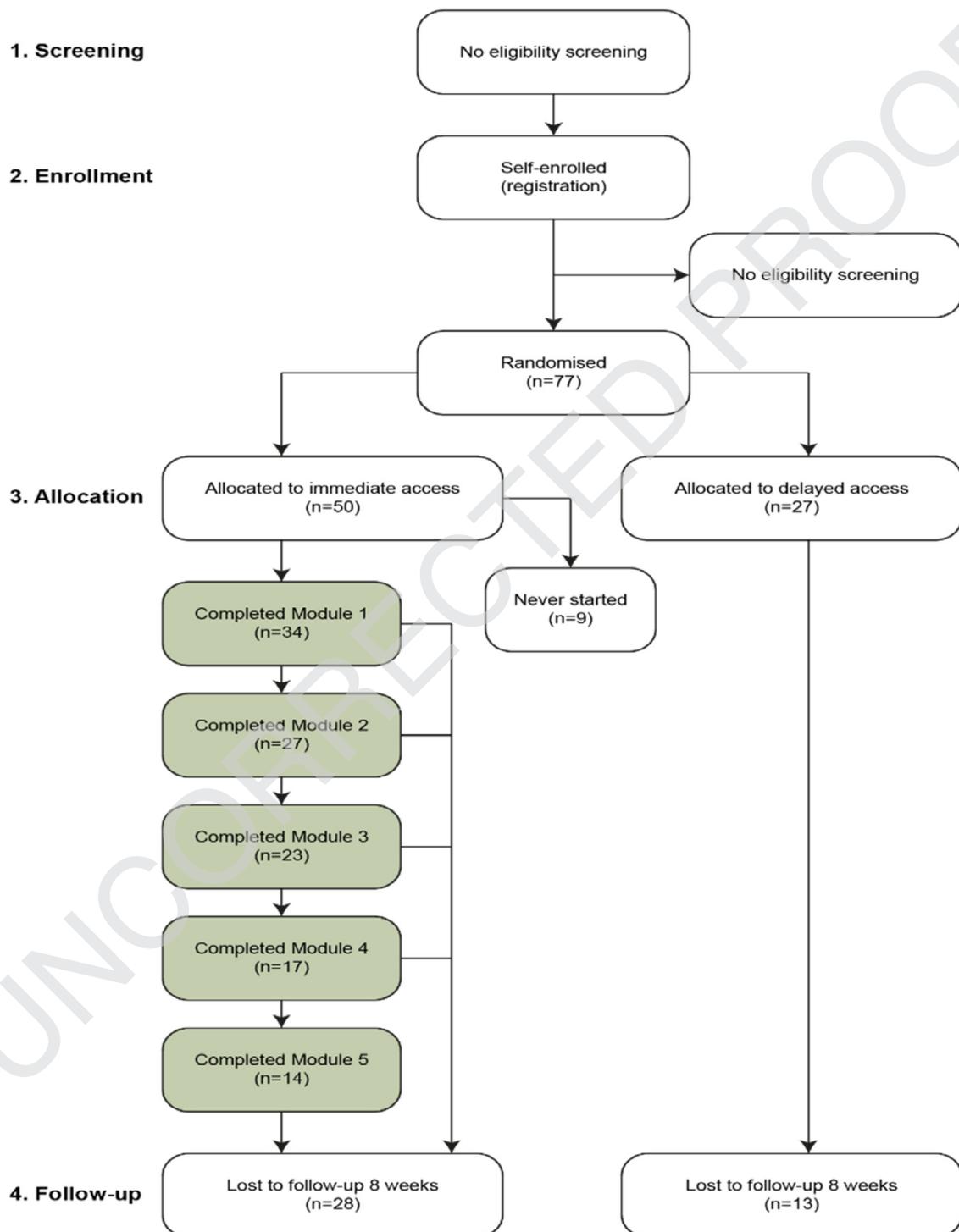


Fig. 1. Chart to show participant flow through the five-module intervention.

Table 2
Baseline characteristics of participants in feasibility study.

Characteristics N = 77	Immediate access group n = 50	Delayed access group n = 27
Age		
18–30	27 (54.0%)	22 (81.5%)
30–50	20 (40.0%)	5 (18.5%)
50–65	3 (6%)	0
Gender		
female	46 (92.0%)	24 (88.9%)
Speciality		
adult	26 (52%)	17 (63.0%)
mental health	12 (24%)	2 (7.4%)
child health	5 (10%)	4 (14.8%)
primary care	1 (2%)	0
health visiting	0	1 (3.7%)
other	6 (12%)	3 (11.1%)
Course		
BSc (2nd and 3rd yr.)	19 (38%)	15 (55.6%)
PGDip	15 (30%)	5 (18.5%)
Postgraduate	11 (22%)	5 (18.5%)
Post registration	5 (10%)	2 (7.4%)
Missing	0	0
Time since qual		
Not qualified	23 (46%)	13 (48.1%)
Less than 1 year	2 (4%)	4 (14.8%)
1–5 years	12 (24%)	7 (25.9%)
6–10 years	6 (12%)	3 (11.1%)
Over 10 years	7 (14%)	0
Previous mindfulness		
None	26 (52%)	17 (63%)
A little	23 (46%)	10 (37%)
A lot	1(2%)	0

245 if they did not complete the final module before this time.) Whilst 35.1% ($n = 27/77$) completed 14 weeks (post-registration) follow
 246 up measures and 40.3% ($n = 31/77$) completed them at 20 weeks post-registration. In the delayed access group, at 20 weeks, 22%
 247 reported that they had accessed mindfulness resources during the wait period. Only three of the 27 participants in the delayed access
 248 control group chose to access the intervention at the end of the study period.

249 **Table 3** provides a description of how the outcome measures varied across follow ups. This information is presented here purely
 250 to show the appropriateness of these specific measures with this sample. There was no evidence of floor or ceiling effects on any of
 251 the scales. Scores on the stress scale reduced by four to six points over time in both groups, although the reduction was larger in the
 252 immediate access group. The fear of self-compassion scale showed relatively large score changes, in a positive direction (between
 253 five to seven points post-intervention) with minimal changes observed in the delayed access group. The fear of compassion for others
 254 scale showed a small rise (i.e. indicating a greater fear of providing compassion to others) post-intervention. This decreased again at
 255 14 weeks after registration and remained lower than baseline at 20 weeks.

256 3.5. Acceptability of the intervention

257 **Table 4** shows that most modules received scores of between 3 and 4.5 (possible range 1–5) which suggests positive attitudes
 258 towards the intervention. Satisfaction means for modules ranged from 3.7 for module one, to 4.3 for module five. Means were
 259 between 4.0 and 4.5 for clarity of the modules, between 3.8 and 4.7 for usefulness of material for nurses, and 3.9 to 4.4 for relevance
 260 outside of work. Participants rated their confidence in understanding mindfulness between 3.8 and 4.5. The lowest ratings were for
 261 participants' confidence in their ability to find time to practice, as these ratings ranged from 3.1 to 3.9. Although participants were
 262 able to email mindfulness experts with practice questions, none emailed the team to ask for help.

263 3.6. Interviews: acceptability

264 All 41 participants who had accessed the first module were invited for interview. From this, twelve (29.2%) consented and were
 265 interviewed. All twelve had completed at least four modules, with the majority (75.0%, $n = 9$) completing all five. Seven were studying
 266 for post-registration and five for pre-registration qualifications. Eleven identified as female. All were between 18 and 45. Reflecting
 267 the structure of the interviews, three distinct themes could be identified in the data, each with its own set of sub-themes, namely:
 268 1) expectations and factors influencing participants' engagement with the intervention; 2) experience of completing the intervention
 269 and practising mindfulness; and 3) the impact of mindfulness on their nursing practice and other areas.

Table 3

Outcome mean scores with SD at baseline, post-intervention and at 14 and 20 weeks follow up both by group and overall.

Measure	Overall Immediate access group					Delayed access group			
	Baseline - registered participants N = 86 +	Baseline n = 50	Post-intervention n = 22	Fourteen Weeks n = 16	Twenty weeks n = 19	Baseline n = 27	Post-intervention n = 14	Fourteen Weeks n = 11	Twenty weeks n = 12
Compassion for others (FCS) Min=0 to max=40 indicating high fear	12.50 (SD = 6.99)	12.30 (SD = 7.04)	14.13 (SD = 9.3)	11.88 (SD = 8.41)	10.21 (SD = 7.4)	13.04 (SD = 7.34)	12.78 (SD = 4.50)	14.27 (SD = 8.46)	10.58 (SD = 8.36)
Self-compassion (FCS) Min=0 to max=60 indicating high fear	21.34 (SD = 11.32)	19.42 (SD = 11.09)	13.44 (SD = 9.95)	11.06 (SD = 9.84)	10.21 (SD = 6.56)	24.00 (SD = 10.74)	21.64 (SD = 11.02)	24.18 (SD = 13.60)	23.83 (SD = 13.7)
Empathic concern (Subscale IRI) Min=0 to max=28 indicating high empathy	21.9 (SD = 3.78)	22.0 (SD = 3.83)	20.17 (SD = 4.26)	19.41 (SD = 4.12)	20.89 (SD = 3.91)	21.82 (SD = 3.62)	22.43 (SD = 2.93)	+	22.08 (SD = 3.56)
Mindfulness (MAAS) 1 to 6 High scores = greater mindfulness	3.17 (SD = 0.87)	3.32 (SD = 0.86)	3.61 (SD = 0.91)	3.67 (SD = 0.77)	3.78 (SD = 0.96)	3.01 (SD = 0.84)	3.13 (SD = 0.69)	3.28 (SD = 0.81)	3.54 (SD = 0.69)
Stress Scale (PSS) Scores 10–40 High scores=higher stress	22.31 (SD = 5.51)	21.40 (SD = 5.57)	16.69 (SD = 6.28)	17.29 (SD = 4.59)	16.42 (SD = 0.12)	24.03 (SD = 5.43)	20.38 (SD = 5.67)	19.45 (SD = 4.94)	19.33 (SD = 6.24)
Satisfaction (PROQOL) 22 (low), 23 to 41 (average) 42 or above (high)	Intervention only	38.41 (SD = 5.21)	38.18 (SD = 6.03)	37.31 (SD = 5.90)	38.68 (SD = 6.90)	Not collected from control*	47.90 (SD = 5.81)	39.18 (SD = 6.01)	40.750 (SD = 5.46)
Burnout (PROQOL) Less than 22 (low), 23 to 41 (average) 42 or above (high)	Intervention only	24.70 (SD = 6.04)	27.13 (SD = 4.42)	25.25 (SD = 5.39)	25.26 (SD = 5.81)	Not collected from control*	23.39 (SD = 5.60)	24.46 (SD = 5.20)	25.33 (SD = 5.8)
Fatigue (PROQOL) Less than 22 (low), 23 to 41 (average) 42 or above (high)	Intervention only	22.59 (SD = 5.19)	22.04 (SD = 5.49)	20.19 (SD = 5.47)	20.48 (SD = 5.53)	Not collected from control*	22.08 (SD = 4.11)	23.64 (SD = 4.92)	22.92 (SD = 5.52)

+Registered users including those not randomised.

*ProQOL was collected at end of module 2 not at baseline to reduce questionnaire burden on intervention group. Control group could not complete ProQOL at this second time point.

+ Error missing variable.

270 **3.7. Intervention engagement**

271 From the interviews, it appeared that engagement with the intervention was necessary for completion which then led to greater
 272 amounts of practice. The extent of engagement and persistence appeared to depend on several factors: 1) competing events, 2)
 273 expectations and 3) ease of use. In the following analysis, used names are pseudonyms.

274 **Competing events:** Events such as placement or exams had a negative impact on how much time and enthusiasm they could
 275 dedicate to the intervention.

276 *“It was a really difficult time for me to do it because I was on placement and you don’t have a routine – because you know you’re
 277 doing shifts all over the place – you’re doing nights – earlies....” (Jane, Pre-registration).*

278 Not practising as planned made some lose their motivation:

279 *“...I lost interest because I kinda felt like...I wasn’t practising as much as recommended. I wasn’t doing it properly.” (Claire, Post-
 280 registration).*

281 **Expectations:** Participants who completed the modules also reported early investment in the techniques. A number had expect-
 282 ations that mindfulness could be beneficial for them. These were often formed by a need to deal with stress or challenges, their
 283 previous experience of trying to meditate, or through social influence coming from friends and family.

284 *“I do meditation and yoga and I’ve done meditation retreats before now, but I don’t seem to be able to apply that to a clinical setting.”
 285 (Imogen, Post-registration).*

Table 4

Acceptability scores (study specific measure) by module.

Acceptability questions Scores 1 = least positive to 5= most positive	M1 n = 34 Mean (SD)	M2 n = 27 Mean (SD)	M3 n = 23 Mean (SD)	M4 n = 17 Mean (SD)	M5 n = 14 Mean (SD)
How satisfied were you overall with the module?	3.7 (0.6)	3.8 (0.8)	3.8 (0.8)	4.2 (0.4)	4.3 (0.6)
How clear did you find the concepts and ideas in the module?	4.4 (0.7)	4.3 (0.7)	4.0 (0.90)	4.2 (0.7)	4.5 (0.5)
How useful was the content to your work as a nurse?	3.9 (0.8)	4.1 (0.9)	3.8 (0.7)	4.5 (0.5)	4.7 (0.6)
How useful was the content to you personally, outside of work?	4.1 (0.9)	3.9 (0.9)	4.0 (0.8)	4.2 (0.5)	4.4 (0.7)
How confident are you in your understanding of the mindfulness techniques that you have just learnt in the module?	3.8 (0.8)	3.9 (0.8)	3.8 (0.8)	3.8 (0.6)	4.5 (0.6)
How confident do you feel about your ability to find time to practise mindfulness over the coming week?	3.3 (0.9)	3.4 (0.8)	3.1 (0.7)	3.5 (1.1)	3.9 (0.9)

286 *"I had a colleague who'd done mindfulness classes but I'd never gone to any – but she kind of told me a little bit about them and what*
287 *she did in them – and it was quite different to how this course has been"* (Jane, Pre-registration).

288 **Ease of use:** Ease of use was perceived as important. Participants commented on how they had found learning mindfulness online,
289 and several issues were raised during this discussion. The majority had enjoyed learning online and had particularly appreciated the
290 flexibility it afforded. For example, one participant said:

291 *"I thought that having the online format was far more helpful. If it was a weekly session that you had to go to, I don't think I would*
292 *have been able to do it as often as I did."* (Diana, Pre-registration).

293 Most participants liked learning online and independently.

294 *"I think going through the materials made sense. I didn't really need any group input. I didn't feel I needed it and I was able to read it*
295 *and do it wherever and whenever."* (Helen, Pre-registration nurse).

296 A handful of participants reported that it was sometimes tricky to put new practices in context, and that it might have been useful
297 to have spoken to other participants to clarify how to practise them. Three participants suggested the idea of a hybrid course, which
298 involved a face-to-face session to introduce or to finalise the intervention.

299 *"It would be nice to have a de-brief afterwards as a group or an initial thing at the start of the course. Just to have that contact"*
300 *(Imogen, Post-registration).*

301 *"Maybe at the end. Because I felt like for me...I really enjoyed it whilst I was doing it – but it would have been nice at the end if it had*
302 *an end session – an opportunity to just discuss what they found helpful and what they hadn't found helpful and how they incorporated*
303 *it into their practice"* (Claire, Post-registration).

304 However, intervention factors which made the material more difficult to access (e.g. the lack of portability of information or
305 limited mobile access) made it less likely that participants would engage. Two participants suggested that it would have been better
306 as an app. One explained:

307 *"If it had been an app on my phone I would have used it a lot more.... I think there is something about doing it on my own when there*
308 *are people in the house. And I think that taking a laptop into a room is a bit too conspicuous!"* (Carol, Post-registration).

309 Conversely, two other participants said that what they considered to be the "formality" of the laptop in comparison to their mobile
310 phone, was more appropriate for their learning. None of the participants had emailed the mindfulness experts with practice questions.
311 When asked about why they had not used this facility, all interviewees explained that they had found the instructions on how to
312 practice sufficient for their needs.

313 **Establishing a practice:** Several participants identified approaches such as scheduling in advance, that helped them keep going
314 with the intervention. One said:

315 *"I had to do it at a regular time which is I know very difficult for nurses...when you're on nights to do it at a regular time - but I did it*
316 *in the morning."* (Carol, Post-registration).

317 Another confirmed:

318 *"The mindfulness was just trying to start a new habit – which is quite difficult at firstI had to give myself what I call protected*
319 *time to do it – even if it wasn't the whole ten minutes – even if it was just five minutes – it was sort of five minutes for me and I actually*
320 *quite appreciated that."* (Michelle, Post-registration).

321 The following four themes emerged from the data as effects of greater practice:

322 *Self-care:*

323 Several participants reported that the compassion meditations and self-care material had a beneficial impact on the way that they
324 treated themselves. For two participants the idea of prioritising self-care was a revelation which had a significant impact on the way
325 that they thought about themselves. One participant explained:

326 *“As a nurse you feel this pressure to look after people, and if you don’t do that then you’re not a good nurse. That’s what I felt the*
327 *pressure was. But after that module, I felt to be a good nurse I have to look after myself, so it’s not selfish, it’s important to enable me*
328 *to be a good nurse.” (Claire, Post-registration).*

329 Another respondent agreed:

330 *“...as a nurse you are always looking after other people and I think I’ve taken from the course that I need to start taking care of me as*
331 *well because I matter just as much... and it makes me able to do my job properly.” (Michelle, Post-registration).*

332 *Emotional regulation:*

333 An increased ability to regulate negative emotions, particularly stress, at home, university and in nursing practice was also men-
334 tioned. Several participants reported that they were developing a more considered approach to ward stressors, which made them feel
335 better and improved the quality of the care they gave.

336 *When I did mindfulness, I was able to see myself and I was a lot calmer, really think and assess what was going on which is a luxury*
337 *because you don’t always get that time on the ward. When I did, I felt that my shift was running much more smoothly, I was in charge,*
338 *everything was going the way I needed things to go, and I was doing what I needed to do.” (Claire, Post-registration).*

339 STOP and the 3-minute breathing space were considered useful tools to use throughout the day when clinical practice was tough.
340 Another also spoke about being able to use the 3-minute breathing space to check in with herself after being with patients:

341 *“It’s making sure that I don’t carry that emotional baggage with me – okay so write it down and then - if I need to, I can do a three-minute*
342 *meditation right there – just to make sure that I’m okay.” (Michelle, Post-registration).*

343 *Awareness on the ward:*

344 Four participants reported greater awareness in clinical practice; describing how they could come off autopilot to focus on each
345 task as it was performed. This process resulted in paying mindful attention to their patient without distractions. One participant
346 clarified:

347 *“I feel like I can care for patients better – because if they ask me for something I will actually remember. Because sometimes you just*
348 *get so busy and you’re like “yes I’ll do that” – and then you completely forget. Now I do remember.” (Diana, Pre-registration).*

349 Another participant commented on how much more efficient at her role she had become since clearing her head of pervasive
350 thoughts throughout the day and felt that it had improved her engagement with patients:

351 *“If I’m having a one to one with a patient the STOP practice works well there. Then it’s much easier to formulate what I’m going to say*
352 *based on what they’ve said.” (Imogen, Post-registration).*

353 **3.8. Practice after the intervention:** The presence of feedback loops

354 Participants who reported feeling a positive impact of the practices on their lives relatively early on, appeared to find it easier to
355 persevere with the intervention. One participant considered:

356 *“I don’t know – you very consciously remind yourself of doing it and then as you practice it – I suppose it becomes more natural in*
357 *some ways more than others – and eventually some of the ways of doing mindfulness became a natural way to respond to stressful*
358 *situations and tiredness and overload.” (Helen, Pre-registration).*

359 Not practicing as planned made some participants lose their motivation:

360 *“I think that like I kind of dunno – I lost interest because I kinda felt like Cos I wasn’t practicing as much as recommended...I wasn’t*
361 *doing it properly” (Carol, Post-registration).*

362 Similarly, the more practice participants completed, the more likely they were to report establishing a habit, or a fondness for
363 certain practices, which in turn led to more practise.

364 *“And I think, when I finally learned how to incorporate it into what I was doing rather than just thinking okay I have to do this right*
365 *now - I enjoyed it a lot more.” (Claire, Post-registration).*

366 *“The more it went on through the weeks, the more it became a bit of a habit, the more it became easier to slot into my day.” (Michelle,*
367 *Post-registration).*

368 However, although several respondents reported being very keen to maintain their practice because they had witnessed definite
369 benefits to their lives, almost all those interviewed reported that practice levels were lower after having completed the intervention
370 than during it.

371 “At the time five weeks seemed perfectly suitable but now the course is over, I’ve kind of fallen into a bit of a relapse. I have found it
372 quite hard to continue with the practices without the daily organised structure of it.” (Diana, Pre-registration).

373 4. Discussion

374 The quantitative results from this present study suggested that although participants found the intervention largely relevant to
375 their nursing work, they struggled to complete all five modules and to fit formal mindfulness practices into their lives. The qualitative
376 data illuminated how a sample of these participants had engaged with learning mindfulness online. These participants reported how
377 they had used the informal techniques to enhance their nursing practice, allowing them to slow down, focus more on patients’ needs,
378 regulate their emotions, and in some cases, to be more compassionate to themselves. The literature suggests that such outcomes can
379 lead to greater compassion to others (Block-Lerner et al., 2007; Shapiro and Schwartz, 1998; Sinclair et al., 2016). Indeed, some
380 authors suggest that motivation for self-compassion may develop prior to compassion for others (Rodríguez-Carvajal, García-Rubio,
381 Paniagua, García-Diex, and de Rivas, 2016).

382 The attrition rate for the intervention reported in this paper was very high, with 54% failing to complete at least three modules.
383 Lost to follow up rates of 53.2% post-intervention and 59.7% at 20 weeks were also high. High rates of attrition in online mindfulness
384 programmes are not uncommon in non-nursing populations, where online delivery is better established (Fish, Brimson, and Lynch,
385 2016). A meta-analysis by Spijkerman, Pots, and Bohlmeijer (2016) found that attrition from online programmes in a range of
386 clinical and non-clinical populations varied between 8% and 65%. Thus, although face to face mindfulness studies can also suffer
387 from significant attrition, with estimated mean drop-out rates of 29% (Nam and Toneatto, 2016), attrition from online studies can be
388 higher (Fish et al., 2016). These high attrition rates in online mindfulness studies are somewhat counterintuitive given that remote
389 delivery is designed to fit participants’ needs by reducing travel and time commitments. Reasons cited in the literature for non-
390 completion of online mindfulness interventions include lack of time, lack of perceived benefit, and forgetting to practise (Banerjee,
391 Cavanagh, and Strauss, 2017; Fish et al., 2016; Spijkerman et al., 2016), which were echoed by some non-completers in the present
392 study.

393 The literature and this study suggest that persuading nursing students to remain engaged with an online mindfulness interven-
394 tion, particularly one requiring home practice, may be a challenge. We attempted to make the time commitment required by this
395 intervention relatively low. However, there is likely to be less motivation amongst nurses or nursing students with no outstanding
396 clinical problems or psychological symptoms to alleviate, and with no obvious consequences to disengaging from the intervention.
397 We suggest, given the nature of mindfulness it is probably not feasible to conscript participants into mindfulness practice; however,
398 mindfulness techniques could be more formally integrated into the curriculum (McConville, McAleer, and Hahne, 2017). In addition
399 to providing devoted time to practise, this may also increase the perceived relevance and importance of mindfulness for delivering
400 nursing care. For post-registration nurses, the answer may be to attach credits as part of continuing professional development to
401 encourage persistence and denote that such training is valued.

402 Improving the intervention may also reduce attrition. The qualitative data suggest that the intervention was generally well received
403 by those who used it, and there were few suggestions on how it could be improved. However, as can be seen from the comments
404 on ease of use, a few participants suggested that the intervention may have been easier to use as an app. Although this feeling was
405 not universal, some material such as meditation practices could be made available through a mobile app, which could also allow
406 the scheduling and recording of practice through calendar links. Three interviewees also suggested the potential for meeting up in
407 addition to the online learning. The potential for virtual meet ups or face to face meetings either at the beginning or end of the
408 intervention could be explored as a way of providing participants with additional encouragement to continue.

409 For significant benefits to accrue, participants need to practise mindfulness techniques in their everyday life. Both completion and
410 practice rates are poorly reported in many studies (Gilmartin et al., 2017). There was evidence of significant self-reported practice
411 in the present study; the number of participants reporting high to moderate formal weekly practice (e.g. more than three times a
412 week) ranged from 43.5% to 57.1% over the course of the study. The proportion of participants reporting high to moderate weekly
413 informal practice ranged from 47.6% to 69% of the sample. However, as both formal and informal practice was measured by self-
414 report, it may have been subject to inaccurate recall or social desirability bias. Overall, informal practice appeared to be easier for
415 nursing students to incorporate into their daily routine. Research on the impact of informal practice on psychological outcomes is in
416 its infancy (Cavanagh et al., 2018), but an investigation into the contribution of informal practice alone to improving clinical care
417 may be worthwhile.

418 4.1. Strengths and limitations

419 The strengths of this study were that an evidence-based intervention was developed using a systematic approach within a standard
420 framework, guided by expert tutors and informed by the experience of clinical nurses. This development process was transparent,
421 and the resulting intervention remains replicable and available for future testing with a larger population. Substantial qualitative and
422 quantitative feedback was collected across the study to improve the intervention for future iterations. The feasibility and acceptability
423 of the intervention was also thoroughly tested using a randomised design which also assessed future study procedures. The study
424 showed that a waiting list control design may not be appropriate for future effectiveness studies, as a significant number of participants
425 in the control group accessed other mindfulness resources during their wait time, and very few decided to join the study after the
426 wait period was over.

427 The mean scores and standard deviations for all the psychological outcomes are provided to determine their appropriateness for use
428 with similar samples of nursing students and to assist with the derivation of sample sizes in future effectiveness studies which use these
429 measures. However, it is not appropriate to analyse between or within group changes in feasibility studies which are not powered
430 to look at effectiveness (Lancaster, Dodd, and Williamson, 2004). With such a small sample, it would be impossible to determine
431 whether changes between or within groups were due to chance findings through random measurement error, an intervention effect,
432 or other variables extraneous to the intervention (e.g. placement or exams). This means that the intervention would now need to be
433 tested in a larger effectiveness study to obtain evidence of an impact on compassion levels before it could be recommended for use
434 in nursing education for this purpose.

435 A major limitation was that attempts to obtain feedback from non-completers through an online exit survey or interview, were
436 unsuccessful. This could have potentially skewed findings as most of the quantitative and qualitative data collected were from those
437 who had completed at least three modules and who may have been amongst the more enthusiastic. As none of the participants who
438 struggled to complete the intervention consented to be interviewed, this limited the depth of important data that could be collected
439 to explain high attrition and disengagement. Future research would need to determine more effective ways of eliciting the views of
440 participants who find the intervention least helpful. This would help to ascertain whether their lack of engagement related to the
441 intervention itself or to their initial perceptions of the benefits of mindfulness.

442 Although significant progress has been made in developing new ways of delivering mindfulness material (i.e. online, by
443 video/webinar, or smartphone apps) for the general public and clinical populations, this has rarely been extended to healthcare
444 professionals. Mindfulness interventions are also rarely adapted for use in clinical care. To date, there have only been two small
445 quasi-experimental US studies evaluating online mindfulness interventions with nurses, which broadly support the findings in this
446 paper. One delivered mindfulness training through a university online learning system and reported a decrease in participant stress
447 levels (Spadaro and Hunker, 2016). A second evaluated a hybrid intervention of face to face attendance with back-up recordings of
448 sessions accessible online (Sanko, McKay, and Rogers, 2016). Although the latter reported high dropout, participants' stress levels
449 declined and they also self-rated improvements in clinical performance, compassion and communication skills. The key aim of the
450 research in this current paper was to develop a mindfulness intervention which supported compassion, and that was tailored specifi-
451 cally for nurses. Both face to face and online mindfulness interventions for particular groups (e.g. parents) or health conditions (e.g.
452 cancer) comprise mindfulness materials adapted for the common or important issues that these groups encounter. It therefore seems
453 reasonable to argue that those used by healthcare professionals should provide the same salience. If interventions are not targeted
454 in this way, they may fail to persuade clinicians to invest time in them or allow them to transfer mindfulness effectively into their
455 clinical roles. This study begins this process of targeting online mindfulness interventions for nurses.

456 5. Conclusion

457 The UK study reported in this paper builds upon previous research and further expands the scope of mindfulness-based interven-
458 tions to address compassion and quality in clinical practice. Recent research suggests that compassion training practices may convey
459 greater benefits in terms of prosocial behaviour and compassion towards others than standard mindfulness practices (Brito-Pons,
460 Campos, and Cebolla, 2018; Hildebrandt, McCall, and Singer, 2017). Therefore, the inclusion of specific compassion practices, such
461 as those in this current online intervention, may be central to interventions supporting compassion in the workplace.

462 Mindfulness interventions, which offer dual benefits of supporting oneself and enhancing one's care of others, offer a promising
463 approach to engaging professionals in compassion training. The results from this study suggest that whilst many participants did not
464 complete the intervention, those who did reported it to be beneficial. Future research will draw upon participant feedback to develop
465 an optimised intervention and to reduce attrition rates, in preparation for a larger study.

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469 (Chen, Yang, Wang, and Zhang, 2013; Creswell, 2017; Davidson et al., 2003; Kang, Choi, and Ryu, 2009; O'Driscoll, Hat, Corbett,
470 and Serrant, 2018; Ratanasiripong, Park, Ratanasiripong, and Kathalae, 2015; Song and Lindquist, 2015; Young, Bruce, Turner, and
471 Linden, 2001).

472 Declaration of Competing Interest

473 The authors declare that they have no known competing financial interests or personal relationships that could have appeared to
474 influence the work reported in this paper.

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477 **Supplementary materials**

478 Supplementary material associated with this article can be found, in the online version, at doi:[10.1016/j.ijnsa.2020.100004](https://doi.org/10.1016/j.ijnsa.2020.100004).

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