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4

5 **Efficacy of internet-delivered mindfulness for improving depression in caregivers of people with**
6 **spinal cord injuries and chronic neuropathic pain; A randomized controlled feasibility trial**

7 **Abstract**

8 **Objectives:** To explore the feasibility and efficacy of web-based mindfulness training for carers of people with
9 spinal cord injury (SCI).

10 **Design:** Randomized controlled feasibility study with three-month follow-up.

11 **Setting:** Community setting.

12 **Participants:** Spouses/family caregivers of people with SCI and chronic neuropathic pain were recruited via the
13 direct care team and advertisements. Participants were aged over 18 years (no upper age limit), with internet
14 access for the duration of the study. Participants were randomly allocated to an eight-week online mindfulness
15 training intervention ($N=28$), or to receive eight weeks of psychoeducational materials on SCI and chronic pain
16 ($N=27$).

17 **Interventions:** An established web-based, mindfulness training course was delivered over eight weeks.
18 Participants completed ten minute mindfulness practices, twice per day, six days per week, totaling 960 minutes.
19 The control group received a weekly email with psychoeducational materials (based on the established elements)
20 on SCI and pain, for eight weeks.

21 **Main Outcome Measure:** Depression severity.

22 **Results:** Mindfulness reduced depression severity more than psychoeducation at T2 (mean difference = $-.891$,
23 95% CI $[-1.48, -.30]$) and T3 (mean difference = -1.96 , 95% CI $[-2.94, -.97]$). Mindfulness training also reduced
24 anxiety at T2 (mean difference = $-.888$, 95% CI $[-1.40, -.38]$) and T3 (mean difference = -2.44 , 95% CI $[-3.20, -$
25 $1.69]$).

26 **Conclusions:** Results indicate that internet-delivered mindfulness training offers unique benefits, and is viable
27 for caregivers of people with SCI and chronic neuropathic pain. Further work should explore the feasibility of
28 combined education and mindfulness training incorporating both patient and caregiver, for optimum benefit.

29 **Keywords:** telemedicine, meditation, education, anxiety, quality of life

30 **List of Abbreviations:**

ANCOVA - Analysis of Covariance

CBT – Cognitive Behaviour Therapy

MBIs – Mindfulness-based Interventions

QoL - Quality of Life

RCT – Randomized Controlled Trial

SCI – Spinal Cord Injury

32

Introduction

33 Caregiver burden and distress is demonstrated in many populations living with neurological conditions
34 such as spinal cord injury (SCI)¹. Evidence suggests that chronic pain affects 60% of people with SCI²,
35 impeding physical function³, quality of life⁴ and engagement in daily activities like work⁵. By extension,
36 this is likely to complicate care needs and dependence on caregivers. The unique nature of caregiving
37 required after SCI, and additional complications like pain, may induce distress in those providing care⁶,
38 often to a greater degree compared with care recipients¹, highlighting the need to consider caregiver
39 wellbeing alongside that of those with SCI.

40 In addition to the complex needs of people with SCI, caregivers have to manage their own
41 losses associated with SCI⁷, and changes in relationship dynamics and identities⁸. Assuming a caregiver
42 role can represent an attempt to improve the quality of life (QoL) of the injured person, but is costly to
43 the caregiver, whose own QoL deteriorates⁹. Pain is most commonly cited as affecting QoL in both
44 caregiver and care recipient following SCI¹⁰, with those with SCI and neuropathic pain reporting
45 increased self-perceived burden and distress arising from the impact of their care needs on others¹¹, thus
46 family relationships can become strained¹². Addressing the unique needs of caregivers could provide
47 benefits in terms of wellbeing for caregiver and care recipient.

48 The significance of caregiver health is emphasised by increasing studies worldwide reporting
49 the difficulties faced by family members of those with SCI, and the impact these have on the person
50 with SCI, highlighting a need to explore the efficacy of interventions for caregivers. Cognitive-
51 behavioural interventions yield mixed results; a six-month intervention to reduce stress and improve
52 SCI-specific knowledge found no improvement¹³, whilst a four-week psychoeducational programme
53 requiring attendance at 90-minute weekly sessions demonstrated significant improvements in QoL¹⁴.
54 However, caregiving demands and commitments required to attend face-to-face courses, may act as
55 barriers to engagement, and delivering interventions via the internet may be preferred. Shorter, more
56 intensive interventions may, therefore, be warranted.

57 Literature surrounding psychological interventions has seen increasing interest in mindfulness-
58 based interventions (MBIs). Mindfulness is the skill of present-moment awareness that encourages

59 acceptance, rather than changing thoughts and behaviours¹⁵. Practices of attending to internal and
60 external experiences enhance awareness, and the ability to become an observer of one's thoughts¹⁵.
61 Though benefits of mindfulness training are documented for depression, anxiety, and pain following
62 SCI¹⁶, no studies have explored the feasibility of MBIs for caregivers of people with SCI. However,
63 web-delivered MBIs perform similarly to face-to-face interventions, evidencing large effect sizes in
64 reductions in stress¹⁷, comparable to studies employing face-to-face mindfulness¹⁸, and higher than
65 studies of face-to-face CBT¹⁹. Internet-delivered MBIs are therefore likely feasible and effective
66 methods of supporting self-management, offering ways of overcoming barriers to engagement. Through
67 arming caregivers with skills to cope with distress, resilience and QoL could be built in the dyad of
68 caregiver and person with SCI.

69 Lynch & Calahan¹ conclude that there exists a lack of clarity surrounding interventions to
70 improve wellbeing in SCI caregivers. The present study, therefore, aimed to examine the feasibility of
71 internet-delivered mindfulness training, and its efficacy for reducing depression and anxiety, and
72 improving QoL of caregivers of people with SCI. This paper presents results of data collected and
73 analysed as part of a larger study exploring the feasibility of mindfulness training for people with SCI
74 and neuropathic pain and their caregivers, with results of analysis of SCI data published elsewhere¹⁶.

75

Methods

76 Design

77 A between-subjects, single-center RCT design was utilised. A 2 x 3 design was used, assessing the role
78 of intervention (2 levels; mindfulness training or psychoeducational control group), on each outcome
79 measure at each data collection point (3 levels; baseline, T1; post-intervention, T2; and three-month
80 follow-up, T3).

81

82 Participants

83 Participants were recruited from (BLINDED FOR ANONYMITY) in addition to advertisements
84 published in local media, and were spouses/family caregivers of a person with SCI who experienced
85 neuropathic pain and had been injured for a period of at least one year (including traumatic and non-
86 traumatic injuries). Inclusion criteria were: aged over 18 years of age (no upper age limit), sufficient
87 understanding of English, able to access the internet for the duration of the study. Exclusion criteria
88 included: significant cognitive impairment, mental illness or head injury that would prevent engagement
89 in the study (e.g. impede understanding of instructions during guided meditations); insufficient
90 understanding of English; and previous formal and informal practice of mindfulness.

91

92 Procedure

93 Members of the direct care team at BLINDED FOR ANONYMITY identified people with SCI who
94 were then asked to identify a family member who provides them with assistance. Individuals expressing
95 interest in the study were sent generic letters of invitation (i.e. intervention-neutral but informing them
96 of enrollment onto a course to support caregivers of people with SCI, and the requirement of weekly
97 engagement for eight weeks). Those interested in enrolling were screened for eligibility by the direct
98 care team. Following this, informed consent and baseline data were obtained (T1). Participants were
99 then randomized to either receive mindfulness training, or psychoeducational materials via independent,
100 computerized block randomization. Participants were blinded to their intervention, remaining blinded
101 of the alternative group until conclusion of the study. Participant information sheets specific to

102 interventions were provided following randomization, and participants were offered the opportunity to
103 ask questions before commencement of the intervention. Participants engaged with their allocated
104 intervention for eight weeks, after which outcome measures were assessed (T2; analysis was not
105 blinded). After completion of assessments at three-month follow-up (T3), participants received debrief
106 letters and were offered the opportunity to participate in the mindfulness course, or receive the
107 psychoeducational materials, in accordance with their original group allocation.

108

109 **Interventions**

110 Breathworks offers a web-based, eight-week mindfulness training course, evidenced to reduce
111 depression and chronic pain¹⁵. The online course delivered two pre-recorded, ten-minute audio-guided
112 meditations each day (recorded by qualified and experienced mindfulness teachers), six days a week
113 for eight weeks (a total of 960 minutes of practice). Participants were instructed to complete the course
114 individually, at times and locations suitable to them. The course led participants through a progressive
115 experiential exploration of mindfulness, including topics such as breath awareness, and integration of
116 mindfulness in daily life²⁰. Course content can be found in Table 1 (for further detail see Cusens et
117 al.²⁰). The web host (Mindfulness Center, Sweden) monitored participant engagement via a progress
118 bar which indicated when meditations had been completed, notifying the authors when each participant
119 had completed the course. Finally, upon completion of the course, participants received a certificate of
120 completion and continued access to the course resources.

121

122 ***INSERT TABLE 1 HERE***

123

124 Participants in the psychoeducation group received a weekly email for eight weeks, providing
125 psychoeducational materials on SCI and chronic pain to enhance understanding of SCI-specific pain
126 and associated care needs. This acted as an attention control offering minimal but potentially
127 meaningful intervention. Participants were advised to read these materials at times and locations
128 suitable for them. Based in established elements of pain management psychoeducation programmes,
129 content detailed epidemiology of SCI and SCI-specific pain, current understanding of pain using the

130 biopsychosocial model, and the role of stress and mood in pain perception after SCI. Further topics
131 included options for pain and psychological management (pharmacological and non-pharmacological),
132 and sources of support.

133

134 **Measures**

135 Measures were administered before (T1) and after the programme (T2) and at three-month follow-up
136 (T3) for both groups via encrypted, online survey software.

137 **Demographics.** Demographics included four questions pertaining to gender, employment,
138 relationship status, and ethnicity.

139 **The Hospital Anxiety and Depression Scale (HADS²¹).** Higher scores indicate greater
140 depression and anxiety symptom severity on this 14-item measure, with scores ranging from 0 to 21 on
141 each domain. The HADS is a reliable measure of depression and anxiety symptom severity across
142 clinical and nonclinical populations (Cronbach's alpha for HADS-A $\alpha = .83$, for HADS-D $\alpha = .82$ ²²).
143 Each subscale demonstrated strong reliability in the present study (HADS-A $\alpha = .97$; HADS-D $\alpha =$
144 $.97$).

145 **Quality of Life (WHOQoL-BREF²³):** This 26-item questionnaire utilizes a 5-point Likert
146 scale to assess four domains of QoL: physical, psychological, social, and environmental. Summed
147 scores range from 0-100 with greater scores indicating superior perceived QoL in that domain. Validity
148 is demonstrated in UK samples (Cronbach's alpha between $.55$ and $.87$ across the four domains²⁴).
149 Reliability was also strong in the present study ($\alpha = .96$).

150 **Five Facet Mindfulness Questionnaire (FFMQ²⁵):** The FFMQ measures five factors
151 representing mindfulness: observing, describing, acting with awareness, non-judging of inner
152 experience, and non-reactivity to inner experience. The FFMQ contains 39 items scored on five-point
153 Likert scales from 1 (never/rarely true) to 5 (very often/always true). The facet of non-reactivity ranges
154 from 7 to 35, whilst all other facet scores range from 8 to 40, making 195 the maximum score on the
155 FFMQ. Higher scores indicate greater mindfulness. The FFMQ has strong psychometric characteristics,
156 including good reliability ($\alpha = 0.72-0.92$) for all facets²⁵.

157

158 **Retention Rates**

159 Retention rates were calculated via participant discontinuation and loss to follow-up at 3 months.
160 Intervention compliance was described as completing all 960 minutes of mindfulness training, given
161 the aim of the study; to explore the utility of regular engagement in mindfulness training.

162

163 **Statistical Methods**

164 Data were analysed using SPSS version 22. A sample size calculation was performed with G*Power
165 for the primary outcome measure of depression severity; for a power of 80%, an effect size of .40
166 (Cohen's *d*, based on previous review of psychological interventions for people with SCI and
167 caregivers²⁶), two-tailed, with significance set at $p < .05$, a total sample of 52 was required.

168 Data were assessed for distribution normality and outliers. Demographic data is reported as
169 means and standard deviations. Controlling for baseline scores on each outcome measure, multiple
170 univariate analyses of covariance (ACNOVAs) were utilized in preference to multivariate analyses.
171 Confidence intervals and effect sizes (partial eta squared; η^2_p) are reported.

172

173 **Ethical Considerations**

174 This study was approved by BLINDED FOR ANONYMITY (ref: 14/SC/1424), the local Research and
175 Development office, and BLINDED. The trial is registered with an International Standard Randomized
176 Controlled Trial Number (ISRCTN14165286).

177 All participants gave informed consent and were debriefed at completion of the study. Ongoing
178 support was offered and all patient identifiable information and corresponding data files were stored
179 separately on a password-protected computer at The Psychology Department at the University of
180 BLINDED. All applicable institutional and governmental regulations concerning the ethical use of
181 human volunteers were followed during the course of this research.

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Results

A CONSORT flow diagram provides randomization information (Figure 1). Participants were recruited between April 2015 and March 2016. Of 69 assessed for eligibility, 55 were randomized across the two interventions. Intention-to-treat principles were followed; Little’s test indicated that cases were missing at random ($X^2(24, N = 44) = 15.582, p = .900$), and for participants who provided data at T1 and T2, missing data points for T3 were imputed using fully conditional specification multiple imputation. As a result, 55 participants are included in analyses at T1, and 44 at T2 and T3.

Demographic Characteristics

There were 28 participants in the intervention group and 27 in the control group; 29 (52.7%) were male, and mean age was 44 years. Fifty-one percent of the sample were married, and 29% were cohabiting. Most participants were employed full- (54.5%) or part-time (32.7%). The majority of the sample were white British, Irish, or European (85.5%). Participant characteristics are in Table 2. Means and standard deviations for each outcome measure are detailed in Table 3. There were no significant differences between groups on any outcome measure at baseline.

INSERT TABLES 2 AND 3 HERE

Compliance Rate

The total period to screen and enrol the sample was 13 months. By T2, seven participants had discontinued the mindfulness training (13%), and four discontinued psychoeducation (7%); a total intervention compliance rate of 80%. Independent samples t-tests identified no baseline differences between those who discontinued and those who completed the interventions. Five participants allocated to mindfulness training (9%), and five allocated to psychoeducation (9%), were lost to follow-up at T3; a total retention rate of 62%. There were no differences between study completers and those lost to follow-up on baseline measures or demographic variables. No adverse events were reported.

Effect of the Intervention

210 Analysis of covariance (ANCOVA) was conducted for outcome measures with baseline scores set as
211 covariates in each analysis (see Tables 4 and 5). At T2, significant group differences ($p < 0.05$, $\eta^2_p >$
212 $.095$) were found for severity of depression, anxiety, physical, psychological, and social QoL.
213 Significant group differences (favouring mindfulness training) were also identified for subscales of the
214 FFMQ, including observing, acting with awareness, non-judging, non-reactivity to inner experience,
215 and the total FFMQ score. There were no significant differences at T2 for environmental QoL, nor for
216 the FFMQ facet of describing.

217 At T3, group differences ($p < 0.05$, $\eta^2_p > .118$) persisted for severity of depression, and anxiety,
218 as well as social QoL. Similarly, observing, acting with awareness, non-reactivity, non-judging, and
219 total FFMQ scores demonstrated significant group differences.

220

221 ***INSERT TABLES 4 AND 5 HERE***

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Discussion

227 This is the first study exploring the utility of an eight-week, internet-delivered mindfulness training
228 intervention for caregivers of people with SCI. Caregivers engaging with online mindfulness training
229 reported significant improvements in severity of depression and anxiety symptoms, psychological and
230 social QoL, with small-to-medium effect sizes demonstrated for all. Mindfulness training significantly
231 improved all mindfulness facets (except describing) upon completion of the intervention, improvements
232 that were sustained at follow-up. Further reductions in severity of depression and anxiety, and
233 improvement in social QoL were noted at follow-up, demonstrating the utility of internet-delivered
234 mindfulness training for improving wellbeing in caregivers. Improvements in depression, anxiety, and
235 mindfulness reflect benefits observed for people with SCI¹⁶, whilst improvements in QoL were unique
236 to caregivers. For care recipients, the QoL impact of functional and sensory losses associated with SCI
237 may not be alleviated through mindfulness training.

238 Improvements seen in severity of depression in the present study suggest there exists a
239 relationship between increased mindfulness practice and reduced depression, supportive of previous
240 work^{16,27}, which found that, in people with SCI, higher levels of mindfulness correlated with lower
241 levels of depression. Mindfulness training likely initiated increased acceptance of experience and
242 awareness of emotional and social resources at their disposal to control outcomes associated with
243 caregiving demands. Evaluation of the face-to-face version of the course used in the present study found
244 immediate improvements in measures of depression²⁰, suggesting that the online delivery does not
245 compromise the intervention's efficacy. A broad evidence base demonstrates the efficacy of
246 mindfulness training for reducing major depressive relapse²⁸. It is unsurprising, therefore, that internet-
247 delivered mindfulness training offers similar benefits as those seen in face-to-face courses for non-
248 clinical populations (i.e. caregivers), with the additional benefit of reducing travel and time
249 commitments. This validates extending mindfulness training beyond the patient and screening for
250 psychological distress in caregivers, though longer-term follow-up is required. Time constraints were
251 cited as a reason for dropping out, suggesting that there may have been some difficulty integrating
252 regular mindfulness practice into daily life due to pre-existing caregiving burden. Future research

253 should therefore establish which aspects of mindfulness training are most valuable for this group and
254 develop brief interventions that are more readily integrated into daily life.

255 Reductions in anxiety were noted following mindfulness training, supportive of previous
256 work²⁹. As anxiety is characterised by focus on potential threats coupled with an underestimation of the
257 ability to cope, improvements seen in the present study likely arose from the role of mindfulness in
258 interrupting automatic ruminative thinking directing behavioural responses, thus reducing the cognitive
259 components of anxiety³⁰ and offering opportunities to respond adaptively³¹. Improvements in
260 psychological and social QoL were demonstrably larger as a result of mindfulness training compared
261 to psychoeducation, which did not adopt a skills-based approach. Mindfulness promotes non-
262 judgemental observational skills, acceptance and compassion, factors likely to improve awareness of
263 personal responses to the stresses of caregiving³¹, such as taking time for self-care. Mindfulness training
264 therefore likely initiated change through active skills development.

265 The results presented are based on a participant pool of even proportions of male and female
266 caregivers, reflective of changing social norms and the rising assumption of caregiving roles by males³².
267 Evidence suggests that gender differences exist in emotion regulation, with mindfulness techniques
268 leading to greater improvements in anxiety³³ and mindfulness³⁴ for women. However, the effects noted
269 in the present study suggest that internet-delivered mindfulness is beneficial for both male and female
270 caregivers.

271

272 **Study Limitations**

273 In SCI, the average age of caregivers is 53 years old³⁵, whilst the average age of caregivers in the present
274 study was lower (44 years). Younger caregivers display poorer strategies for dealing with mental health
275 issues³⁶, reporting higher rates of depression³⁷. It would be beneficial to explore the effect of
276 mindfulness training on older caregivers, and older people with SCI, to establish the extent of
277 improvements. Similarly, some caregiver characteristics, such as time spent caregiving, were not
278 assessed. Future research should endeavour to tailor interventions to age- and caregiver-specific needs.

279 Other limitations include recruitment from a single centre, and focus upon caregivers of people
280 with chronic neuropathic pain arising from SCI, who may have different support needs (such as reduced

281 functional ability and social participation). Attrition rates may represent the active engagement required,
282 which may act as a barrier to adherence³⁸, indicating a need for brief interventions to accommodate this.
283 Finally, the psychoeducational content focused upon the individual with SCI, rather than specific
284 needs/concerns of caregivers. This was a passive intervention that did not focus upon skills
285 development, and it was not possible to monitor whether participants had read the information. Future
286 work might develop interventions specific to the needs of caregivers and optimise participation in online
287 interventions.

288

289 **Conclusions**

290 This study found that eight weeks of internet-delivered mindfulness training fostered improvements in
291 depression, anxiety and aspects of QoL in caregivers of people with SCI. There is no single, easily
292 implemented, consistently effective method for improving psychosocial outcomes, and a ‘one size fits
293 all’ approach is likely to be ineffective. Caregiving presents diverse challenges for both caregiver and
294 recipient; tailored interventions to meet specific needs of these dyads, and exploration of how
295 interventions for caregiver and care-recipient relate, is warranted.

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Other Information & Acknowledgments

299 This trial is registered with the ISRCTN, reference number ISRCTN14165286. The authors would like
300 to express their thanks to BLINDED for provision of the course.

301
302

Table 1. Details on mindfulness course content.

<u>Week</u>	<u>Content</u>
1	The course began with an introductory video demonstrating navigation of the online server. The first week of the course started with three variants of the body scan, during which participants draw their attention to various areas of the body, moving awareness systematically through each area of the body, noticing actual sensations of the body in a precise and detailed manner, as opposed to attending to thoughts, ideas or fears about these sensations.
2	Breath awareness meditations were introduced, alongside a fourth variant of the body scan. Breath awareness meditations started with broad awareness of the bodily experience of breathing, becoming increasingly focused on more subtle aspects of breathing, such as sensations around the nostrils, and encouraged participants to notice when their attention wandered.
3	Mindful movement was introduced, accompanied by body scans. The mindful movement meditation requires that the participant engage in bodily movements in time with their natural pace of breathing. Participants were encouraged to bring awareness to their physical activity and to pace themselves in daily life.
4	Acceptance and self-compassion meditations were then introduced, with participants encouraged to treat themselves with the kindness that they would treat others with. Participants were encouraged to engage in self-care activities.
5	Participants were encouraged to use their senses seek out pleasant aspects of daily life, thus inspiring them to become more receptive to simple, enjoyable features of their life. Participants were also directed to take a break each hour to focus on something positive. Meditations focused on developing the capacity to notice pleasant aspects of their experience.
6	Cultivation of broad, kind, and confident awareness continued in week 6, with grasping onto pleasant features of life discouraged. Participants were encouraged to appreciate the depth and breadth of experience, both pleasant and unpleasant. In this, participants were directed to acknowledge experiences, and to respond, rather than react, in order to improve their ability to choose adaptive responses.
7	This week introduced meditations that encouraged a kind attitude of connectedness and shared experience to oneself, friends, and others, so as to enhance feelings of connectedness and empathic relating with humanity.

8	During the final week, participants were reminded of all they had been taught throughout the course. Self-compassion and kindness to others meditations were practiced for three days, followed by body scan and breath awareness meditations, which were practiced for the remaining three days. Participants were then presented with a downloadable certificate confirming their completion of 20 hours (960 minutes) of focused training.
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304 Table 2. Demographic and clinical characteristics for partners/caregivers.

		Mindfulness (N=28)		Psychoeducation (N=27)		Total (N=55)	
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
		<i>N</i>	%	<i>N</i>	%	<i>N</i>	%
Age		42.8	11.4	45.0	11.0	44.0	11.1
Gender							
	Male	17	60.7	12	44.4	29	52.7
	Female	11	39.3	15	55.6	26	47.3
Marital status							
	Married	15	53.6	14	51.9	29	52.7
	Cohabiting	8	28.6	8	29.6	16	29.1
	Widowed	3	10.7	2	7.4	5	9.1
	Divorced	2	7.1	3	11.1	5	9.1
Employment status							
	Employed, full time	17	60.7	13	48.1	30	54.5
	Employed, part time	8	28.6	10	37.0	18	32.7
	Unemployed	1	3.6	4	14.8	5	9.1
	Retired	2	7.1	0	0.0	2	3.6
Ethnicity							
	White British	18	64.3	17	63.0	35	63.6
	White Irish	1	3.6	2	7.4	3	5.5
	White European	3	10.7	6	22.2	9	16.4
	Asian	0	0.0	1	3.7	1	1.8
	Bangladeshi	4	14.3	0	0.0	4	7.3
	Other	2	7.1	1	3.7	3	5.5

307 Table 3. Self-report outcome measures for partners/caregivers: Means and standard deviations.

		Mindfulness			Psychoeducation		
		T1	T2	T3	T1	T2	T3
		(N = 28)	(N = 21)	(N = 21)	(N = 27)	(N = 23)	(N = 23)
WHOQoL-BREF							
Physical	Mean	63.29	65.52	67.81	65.33	70.48	70.26
	SD	8.16	4.96	6.15	8.08	5.99	5.71
Psychological	Mean	66.29	68.43	67.97	63.19	65.22	65.35
	SD	6.43	4.61	5.71	7.21	5.57	2.94
Social	Mean	69.21	74.14	75.89	62.26	65.83	64.48
	SD	8.18	4.36	5.20	9.49	6.94	6.21
Environmental	Mean	64.04	66.38	68.50	62.85	64.39	66.61
	SD	6.53	4.18	6.41	5.01	4.82	3.98
HADS							
Depression	Mean	11.50	10.57	8.86	10.59	10.78	10.30
	SD	3.82	3.57	3.22	5.29	4.89	4.28
Anxiety	Mean	11.46	10.38	8.13	9.78	9.78	9.39
	SD	3.39	3.26	2.12	4.93	5.05	4.41
Mindfulness	Mean	117.36	130.10	130.62	110.63	113.39	112.30
Total (FFMQ)	SD	17.38	16.66	15.33	25.34	20.99	20.66
Observing	Mean	24.50	26.86	26.63	23.56	23.13	23.09
	SD	4.26	4.73	4.37	6.07	4.95	4.76
Describing	Mean	23.86	25.67	25.58	22.41	23.43	23.35
	SD	4.18	4.96	4.46	5.79	4.96	4.75
Acting with awareness	Mean	23.54	25.90	25.78	22.44	22.87	22.65
	SD	3.39	3.18	3.28	5.29	4.39	4.18
Non-judging	Mean	22.96	25.43	26.25	21.59	22.22	21.74

	SD	4.05	4.01	4.16	4.89	3.97	3.98
Non-reactivity	Mean	22.50	26.24	26.37	20.63	21.74	21.48
	SD	4.44	4.13	4.21	5.08	4.64	4.63

308 WHOQoL-BREF = World Health Organization Quality of Life Brief Scale. HADS = Hospital
309 Anxiety and Depression Scale. FFMQ = Five Facet Mindfulness Questionnaire.

310

311 Table 4. Analysis of covariance for group effects at T2. (N = 44)

Measure	<i>F</i>	<i>p</i> -value	η^2_p	Mean Difference T2 (mindfulness – control)	95% CI (lower, upper)
WHOQoL-BREF					
Physical	7.71	.008*	.158	-4.22	-7.30, -1.15
Psychological	4.28	.045*	.095	2.33	.06, 4.60
Social	13.32	.001*	.245	5.49	2.45, 8.53
Environmental	.93	.342	.022	.79	-.87, 2.46
HADS					
Depression	9.37	.004*	.186	-.891	-1.48, -.30
Anxiety	12.51	.001*	.234	-.888	-1.40, -.38
FFMQ					
Total	37.72	.000*	.479	9.45	6.35, 12.56
Observing	15.03	.000*	.268	2.71	1.30, 4.12
Describing	1.42	.241	.033	.56	-.39, 1.50
Acting with Awareness	18.08	.000*	.306	1.98	1.04, 2.93
Non-judging	7.62	.009*	.157	1.90	.511, 3.29
Non-reactivity	26.56	.000*	.393	2.43	1.48, 3.38

312 * = $p < 0.05$

313 WHOQoL-BREF = World Health Organization Quality of Life Brief Scale. HADS = Hospital
 314 Anxiety and Depression Scale. PCS = Pain Catastrophising Scale. FFMQ = Five Facet Mindfulness
 315 Questionnaire.

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317 Table 5. Analysis of covariance for group effects at T3. (N = 44)

Measure	<i>F</i>	<i>p</i> -value	η^2_p	Mean Difference T3 (mindfulness – control)	95% CI (lower, upper)
WHOQoL-BREF					
Physical	1.56	.325	.036	-1.68	-5.06, 1.69
Psychological	3.43	.113	.076	2.55	-.28, 5.378
Social	30.21	.000*	.424	9.77	6.17, 13.36
Environment	.73	.461	.018	1.14	-1.80, 4.07
HADS					
Depression	16.09	.000*	.281	-1.96	-2.94, -.97
Anxiety	43.09	.000*	.588	-2.44	-3.20, -1.69
FFMQ					
Total	55.56	.000*	.057	11.66	8.50, 14.82
Observing	15.59	.000*	.275	2.68	1.31, 4.05
Describing	2.35	.162	.054	.74	-.26, 1.74
Acting with Awareness	19.26	.000*	.318	2.13	1.15, 3.12
Non-judging	18.25	.000*	.307	3.32	1.75, 4.90
Non-reactivity	26.91	.000*	.395	2.92	1.78, 4.06

318 * = $p < 0.05$

319 WHOQoL-BREF = World Health Organization Quality of Life Brief Scale. HADS = Hospital
 320 Anxiety and Depression Scale. PCS = Pain Catastrophising Scale. FFMQ = Five Facet Mindfulness
 321 Questionnaire.

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