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# WHO EXPERIENCES DEPRESSIVE SYMPTOMS FOLLOWING MINDFULNESS-BASED STRESS REDUCTION AND WHY?

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## ABSTRACT

*Background: A small percentage of patients screen positive for depression following a mindfulness-based program. We identified patient characteristics associated with this outcome in order to understand this phenomenon.*

*Methods: Depressive symptoms, stress, mindfulness, coping with illness and sense of coherence were measured in 126 patients with various medical and psychological conditions pre- and post- Mindfulness-Based Stress Reduction (MBSR).*

*Results: Fewer patients (27% vs. 49%) screened positive for depression post-MBSR. Both pre- and post-MBSR patients who were depressive following MBSR scored lower on meaningfulness, comprehensibility, and manageability (sense of coherence), higher on emotional coping and lower on palliative and distraction coping. Smaller positive changes (e.g. stress) occurred in these patients as well. Viewing life as less meaningful pre-MBSR predicted more symptoms of depression post-MBSR.*

*Conclusions: Patients who suffered depressive symptoms following the program were unable to reappraise their lives in such a way as to become stress resilient.*

Mindfulness training has garnered much attention in the past decade as a way to help patients with chronic physical and psychological conditions to cope better with stress and illness[1-6]. Mindfulness-Based Cognitive Therapy (MBCT) has been included in the National Institute of Health and Clinical Excellence (NICE) guidelines in the UK as an evidence-based intervention to prevent depressive relapse[7]. MBCT uses the Mindfulness-Based Stress Reduction (MBSR) program as a blueprint. MBSR was developed in the United States in the late 1970s, and has been studied in much of the literature pertaining to mindfulness training. Published qualitative and systematic reviews (e.g. Bohlmeijer, Prenger, Taal, and Cuipers[8]; Grossman et al.[9]; Marchand[10]) indicate that MBSR relieves psychological distress, increases quality of life, and is beneficial for patients with various diseases[11, 12]. Toneatto and Nguyen[13] stated that mindfulness training does not have a reliable effect on depression and anxiety; however, this conclusion was critiqued by Hofmann et al.[14] who conducted a rigorous meta-analysis and determined that both MBSR and MBCT are promising interventions for treating anxiety and depression in clinical populations.

While the debate on the merits of this popular program continues, we are struck by the lack of attention to the possibility that some patients may feel *worse* following the program. One finds comments regarding there being "no undesirable side effects" (e.g. Merkes[11]) but these statements do not seem to be empirically-based. Dobkin et al.[15] asked the question, "For whom may participation in a MBSR program be contraindicated?" to open a dialogue pertaining to this important issue.

Here we examined data from 126 patients with various chronic illnesses who participated in the MBSR program offered between 2006 and 2012; while there were significant positive outcomes on most measures for the entire group[16], a subgroup (n = 34) scored in the depressed range following the program. We compared pre- and post-MBSR differences between these patients and the 92 who did not screen positive for depression on stress, mindfulness, coping with illness, and sense of coherence to explore potential explanations for this finding.

## METHODS

### Patients

Patients were recruited via the Internet, flyers in breast cancer clinics, and health care professionals who took our Mindfulness-Based Medical Practice workshop or 8-week course.

Group formation was based on the Center for Epidemiologic Studies Depression Scale (CES-D)

This 20-item scale is a screening tool for depression[17]. Scores range from 0 to 60, with a higher score indicating more symptoms of depression; the time frame is the past week for the population at large; according to the questionnaire founders a score of 16 or more indicates a positive screen for depression. The CES-D has good psychometric properties, with good internal validity and test-retest reliability. For the present sample, the Cronbach's alpha was .91 for both pre-MBSR and post-MBSR.

## Procedures

All patients were interviewed by a clinical psychologist (PLD) with 25 years of experience treating patients with chronic illness and training in MBSR from the University of Massachusetts Center for Mindfulness. If a patient screened high on symptoms of depression before the program, a referral was made and/or appropriate treatment was recommended. The ethics committee of the McGill Faculty of Medicine approved the study and all patients signed an Informed Consent form.

Intervention: Mindfulness-Based Stress Reduction Program

The MBSR program[18] was provided by the same instructor (PLD) to 11 different groups of 7-17 patients per group (mean=12 participants, SD=3), who met weekly for 2.5 hour classes for 8 consecutive weeks to learn mindfulness meditation and stress management techniques. Patients received a home practice manual and CDs created by the instructor to teach the following meditation practices: body-scan, sitting meditation, hatha yoga, and meditation involving visual imagery. Classes were structured and progressively taught means of coping with stress through meditation practice and dialogue about the practice in and out of the group meeting setting. Patients were asked to complete specific home practice exercises for 45-60 minutes per day. As the program progressed, they selected which type of home practice was most suited to them. Informal practice (integrating mindfulness into daily activities) was also included in home assignments. Participation in a 6-hour silent retreat day, provided after the sixth class, was part of the program; it consolidated what had been learned throughout the program.

## Measures

The Perceived Stress Scale-10 (PSS-10).

The PSS-10[19, 20] was developed to measure the extent to which respondents appraise situations in their life to be stressful during the past month. Each item is scored from 0 to 4, with scores ranging from 0 to 40; higher scores indicate a greater level of perceived stress. This scale has been shown to have good internal validity and test-retest reliability. For the present sample, Cronbach's alpha was .89 for both times.

Coping with Health Injuries and Problems (CHIP).

The CHIP, developed by Endler and Parker[21], is a 32-item self-report questionnaire with scores that span a 5-point Likert scale, ranging from 1 = not at all, 3 = moderately, to 5 = very much. Respondents are asked how much they engage in various strategies when faced with health problems. There are four subscales: Distraction, which refers to the use of actions and cognitions that are aimed at avoiding preoccupation with the health problem; Palliative, which refers to engaging in self-care activities to alleviate the unpleasantness of the situation; Instrumental, which refers to focusing on task-oriented strategies to deal with illness (e.g., get information); Emotional, which refers to the extent to which one focuses on the emotional consequences of the health problem (e.g., get frustrated). The CHIP has good reliability and validity, and is considered a psychometrically sound measure of response to illness that is applicable across diverse patient populations. For the present sample, Cronbach's alphas were .75 and .81 for pre- and post-MBSR for Distraction, respectively; .65 at both times for Palliative; .79 and .84 for Instrumental, pre-and post-MBSR, respectively; and .83 and .87 for Emotional, pre- and post-MBSR, respectively.

Sense of Coherence (SOC).

The SOC is a 29-item questionnaire that assesses the extent to which a respondent views their internal and external environments as structured, predictable, and manageable[22]. The Sense of Coherence questionnaire has three subscales: Comprehensibility, which refers to when the social world is interpreted by the respondent as rational, understandable, structured, ordered, consistent, and predictable; a sample item is: "When you face a difficult problem, the choice of a solution is: 1 = always confusing and hard to find, 7 = always completely clear." Manageability, which involves the extent to which the respondent considers his or her coping resources to be available and adequate to deal with life's challenges; a sample item is: "Do you have the feeling that you're being treated unfairly? 1 = very often, 7 = very seldom or never". Meaningfulness reflects whether a situation is appraised as challenging and worth investing in or making a commitment to cope with it. A sample item is: "Life is: 1 = full of interest, 7 = completely routine." The SOC has good internal validity and good test-retest reliability. It has been used extensively in the study of health and well-being[23]. Cronbach's alphas were .77 and .82 for Comprehensibility pre-and post-MBSR, respectively; .78 and .74 for Manageability pre- and post-MBSR, respectively; .88 for both times for Meaningfulness.

Mindful Attention Awareness Scale (MAAS).

Brown and Ryan[24] developed the MAAS, a 15-item scale, to measure mindfulness, defined as a present-centered attention to and awareness of accessible internal and external experiences. It has been shown to be inversely related to rumination, reported physical symptoms, and somatization. MAAS scores range from 1 to 6, with higher scores reflecting greater degrees of mindfulness. The average MAAS score for a community sample is 4.22 (SD = 0.63). Cronbach's alphas were .89 at both times.

Follow-up Questionnaire

The follow-up questionnaire was developed by Kabat-Zinn and his colleagues. Patients were asked to indicate on a scale of 1 to 10 "how useful and beneficial" various components of the course (e.g., yoga, group discussions) were as well as how satisfied they were with the program.

## Statistical Analysis

Patients were divided into two groups based on their post-MBSR CES-D scores. A score of 16 or higher included patients who were in the depressive group (n = 34), while those who scored lower than 16 were in the comparison group (n = 92). Statistical tests were performed to determine if there were differences between groups at baseline. Independent samples t-tests were run on age and pre-MBSR PSS, MAAS, CHIP, and SOC scores. Chi-square analyses were run for gender, education, and primary diagnosis. Skewness and kurtosis were also checked for each variable. All variables were normally distributed except for post-MBSR CES-D, which was slightly skewed (skewness = 1.025).

Two separate group-by-time repeated measures ANOVAs were performed for PSS and for MAAS. Two separate group-by-time repeated measures MANOVAs were performed for the four CHIP subscales and the three SOC subscales, respectively. Descriptive statistics were generated and main and interaction effects were examined. In all statistical tests, homogeneity of variance and compound symmetry were checked and Greenhouse-Geisser correction applied where necessary.

A multiple linear regression analysis was performed to identify potential baseline predictors of post-MBSR CES-D scores; CES-D scores were no longer grouped by cut-off at 16, but used as a continuous variable. Both forward and backward selection methods were used to achieve a parsimonious model. Only variables detected by both methods were preserved.

Finally, Pearson's correlation coefficients were calculated for the change in mindfulness and outcome variables for each group separately. All analyses were performed with SPSS for Windows, version 12.0 (2003).

# RESULTS

## Patients

Table 1 shows the patient characteristics for both groups at baseline. There were no significant differences on gender or age. There were significant differences between the groups on diagnosis ($X^2$ (4) = 17.97, $p$ < .001), with the depressive group having fewer patients with breast cancer. Pre-post CES-D results showed that 34.9% were below the cutoff at both times; 6.3% worsened; 38.2% improved; and 20.6% were above the cutoff at both time points.

| Variables | CES-D < 16[a] | CES-D ≥ 16[b] | Statistic | p[c] |
|---|---|---|---|---|
| **Demographics** | | | | |
| Sex (% female) | 79 (85.9%) | 29 (85.3%) | $X^2$ = .007 | .94 |
| Age | 52.01 (13.37) | 53.06 (13.36) | t = .39 | .70 |
| Diagnosis (% breast cancer) | 45 (48.9%) | 14 (41.2%) | $X^2$ = 17.97 | .001 |
| **Questionnaires** | | | | |
| PSS | 19.10 (6.30) | 23.35 (6.29) | t = 3.36 | .001 |
| MAAS | 3.74 (0.83) | 3.68 (0.86) | t = -.37 | .71 |
| CHIP – distractive coping | 26.08 (5.38) | 21.29 (5.58) | t = -4.31 | .000034 |
| CHIP – palliative coping | 23.57 (4.66) | 24.62 (4.59) | t = 1.13 | .26 |
| CHIP – instrumental coping | 33.01 (5.35) | 31.68 (5.25) | t = -1.25 | .21 |
| CHIP – emotional coping | 23.42 (7.23) | 26.18 (7.33) | t = 1.89 | .06 |
| SOC – comprehensibility | 42.55 (7.68) | 38.32 (7.97) | t = -2.72 | .0075 |
| SOC – manageability | 47.16 (6.31) | 42.29 (8.16) | t = -3.54 | .00056 |
| SOC – meaningfulness | 42.89 (6.95) | 35.03 (8.93) | t = -5.21 | .0000008 |

**Table 1** Patient demographics and mean values of the questionnaires pre-MBSR

[a] n = 92
[b] n = 34
[c] Bonferroni correction α=0.05/12 = 0.0042

Separate repeated measures ANOVAs were performed to examine the effect of group and time on stress and mindfulness. For stress, there was a significant two-way interaction effect ($F(1,124) = 16.82$, $p < 0.0001$) as well as significant main effects for time ($F(1,124) = 36.96$, $p < 0.0001$) and group ($F(1,124) = 51.08$, $p < 0.0001$). Post-hoc analysis revealed that while the non-depressive group's PSS score significantly decreased from pre- (mean = 19.10, SD = 6.31) to post-MBSR (mean = 12.89, SD = 4.54; $p < 0.001$), there was no significant decrease in the depressive group (pre-MBSR mean = 23.35, SD = 6.29, post-MBSR mean = 22.15, SD = 5.47; $p < 0.25$).

For mindfulness, there was a significant main effect for time ($F(1,124) = 47.00$, $p < 0.0001$) qualified by a significant two-way interaction ($F(1,124) = 5.49$, $p = 0.02$). There was no significant main effect for group. Post-hoc analyses revealed that there were significant increases for both groups over time. The depressive group increased from 3.68 (SD = 0.86) to 3.97 (SD = 0.74), and the non-depressive group from 3.74 (SD = .83) to 4.34 (SD = 0.65). Table 2 shows the results of the ANOVAs.

| | CES-D < 16 (*n* = 92) | | | | CES-D ≥ 16 (*n* = 34) | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **Pre** | **Post** | ***d*[a]** | ***p*[b]** | **Pre** | **Post** | ***d*[a]** | ***p*[b]** | ***p*$_{int}$[c]** |
| **PSS** | 19.10 (6.31) | 12.89 (4.54) | 1.13 | 0.000 | 23.35 (6.29) | 22.15 (5.47) | 0.20 | 0.25 | 0.000 |
| **MAAS** | 3.74 (0.83) | 4.34 (0.65) | -0.80 | 0.000 | 3.68 (0.86) | 3.97 (0.74) | -0.36 | 0.009 | 0.021.00 |

**Table 2** ANOVAs results for PSS and MAAS

[a] Effect sizes calculated using the following formula: Cohen's $d = M_{pre} - M_{post} / SD_{pooled}$; large effect size equals >.08; medium effect size equals >.05; small effect size equals >.02.
[b] *p* is based on mean difference (*i* – *j*), ANOVA
[c] *p* interaction is based on the univariate tests of within-subjects interaction effect

As shown in Table 3 separate, repeated measures MANOVAs were conducted for the four subscales of the CHIP and the three subscales of the SOC, respectively. Multivariate tests revealed significant two-way interactions for the CHIP (Wilk's λ=0.92, F(4,121) = 2.79, $p < 0.03$) and main effects for time (Wilk's λ=0.70, F(4,121) =13.17, $p < 0.0001$) and for group (Wilk's λ=0.76, F(4,121) = 9.76, $p < 0.0001$). Univariate analyses revealed a significant two-way interaction for the palliative coping subscale (F(1,124) = 7.16, $p < 0.008$). Depressive patients decreased from 24.62 (SD = 4.59) to 23.15 (SD = 4.76), while non-depressive patients increased from 23.57 (SD = 4.66) to 24.49 (SD = 4.43). Further univariate analyses revealed significant time effects for the other three subscales: distractive coping (F(1,124) = 6.17, $p < 0.014$), instrumental coping (F(1,124) = 16.12, $p< 0.0001$), and emotional coping (F(1,124) = 38.65, $p < 0.0001$). Two subscales showed significant between-subjects group effects for distractive coping (F(1,124) = 31.47, $p < 0.0001$) and emotional coping (F(1,124) = 8.87, $p <0.003$).

| | CES-D < 16 (*n* = 92) | | | | CES-D ≥ 16 (*n* = 34) | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **CHIP subscales** | **Pre** | **Post** | ***d*[a]** | ***p*[b]** | **Pre** | **Post** | ***d*[a]** | ***p*[b]** | ***p*$_{int}$[c]** |
| Distractive coping | 26.08 (5.38) | 24.81 (5.80) | 0.23 | 0.000 | 21.38 (5.58) | 21.74 (5.18) | -0.07 | 0.67 | 0.08 |
| Palliative coping | 23.57 (4.66) | 24.49 (4.43) | -0.20 | 0.05 | 24.62 (4.59) | 23.15 (4.76) | 0.31 | 0.06 | 0.01 |
| Instrumental coping | 33.01 (5.35) | 31.78 (6.17) | 0.22 | 0.015 | 31.68 (5.25) | 29.03 (6.83) | 0.44 | 0.002 | 0.14 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Emotional coping | 23.42 (7.23) | 18.18 (6.51) | 0.76 | 0.000 | 26.18 (7.33) | 22.79 (7.76) | 0.45 | 0.005 | 0.18 |

**Table 3** MANOVA results for CHIP

Note: Multivariate F (4,121) = 2.79; Wilks' Lambda = .916; p = .029
[a] Effect sizes calculated using the following formula: Cohen's d = Mpre - Mpost / SDpooled; large effect size equals >.8; medium effect size equals >.5; small effect size equals >.2.
[b] p is based on mean difference (i – j), ANOVA
[c] *p* interaction is based on the univariate tests of within-subjects interaction effect

For the SOC subscales, there were significant two-way interactions and main effects. For the interaction, Wilk's λ=0.91, F(3,122) = 3.98, $p < 0.01$. For the main effect of time, Wilk's λ=0.81, F(3,122) = 9.51, $p < 0.0001$, and for the main effect of group, Wilk's λ=0.69, F(3,122) = 20.44, $p < 0.0001$. Univariate tests revealed significance on each of the three subscales: comprehensibility, F(1,124) = 8.89, $p < 0.0035$; manageability, F(1,124) = 8.52, $p < 0.0042$; and meaningfulness, F(1,124)=3.89, $p < 0.051$. Post-hoc analyses show that while comprehensibility, manageability, and meaningfulness for the non-depressive group significantly increased, they did not for the depressive group. There were also significant differences between groups at both time points as seen in Table 4.

| | **CES-D < 16 (*n* = 92)** | | | | **CES-D ≥ 16 (*n* = 34)** | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **SOC subscales** | **Pre** | **Post** | ***d*[a]** | ***p*[b]** | **Pre** | **Post** | ***d*[a]** | ***p*[b]** | ***p*$_{int}$[c]** |
| **Comprehensibility** | 42.55 (7.68) | 47.78 (6.85) | -0.72 | 0.000 | 38.32 (7.97) | 39.09 (7.38) | - 0.10 | 0.55 | 0.0035 |
| **Manageability** | 47.16 (6.31) | 50.45 (5.16) | -0.57 | 0.000 | 42.29 (8.16) | 41.97 (6.11) | 0.04 | 0.76 | 0.0042 |
| **Meaningfulness** | 42.89 (6.95) | 46.71 (5.23) | -0.62 | 0.000 | 35.03 (8.93) | 36.68 (8.08) | - 0.19 | 0.08 | 0.051 |

**Table 4** MANOVA results for SOC

Note: Multivariate F (3,122) = 3.98; Wilks' Lambda = .911; p = .0096
[a] Effect sizes calculated using the following formula: Cohen's d = Mpre - Mpost / SDpooled; large effect size equals >.08; medium effect size equals >.05; small effect size equals >.02.
[b] p is based on mean difference (i – j), ANOVA
[c] p interaction is based on the univariate tests of within-subjects interaction effect

All results are shown graphically in Figures 1a-3c.

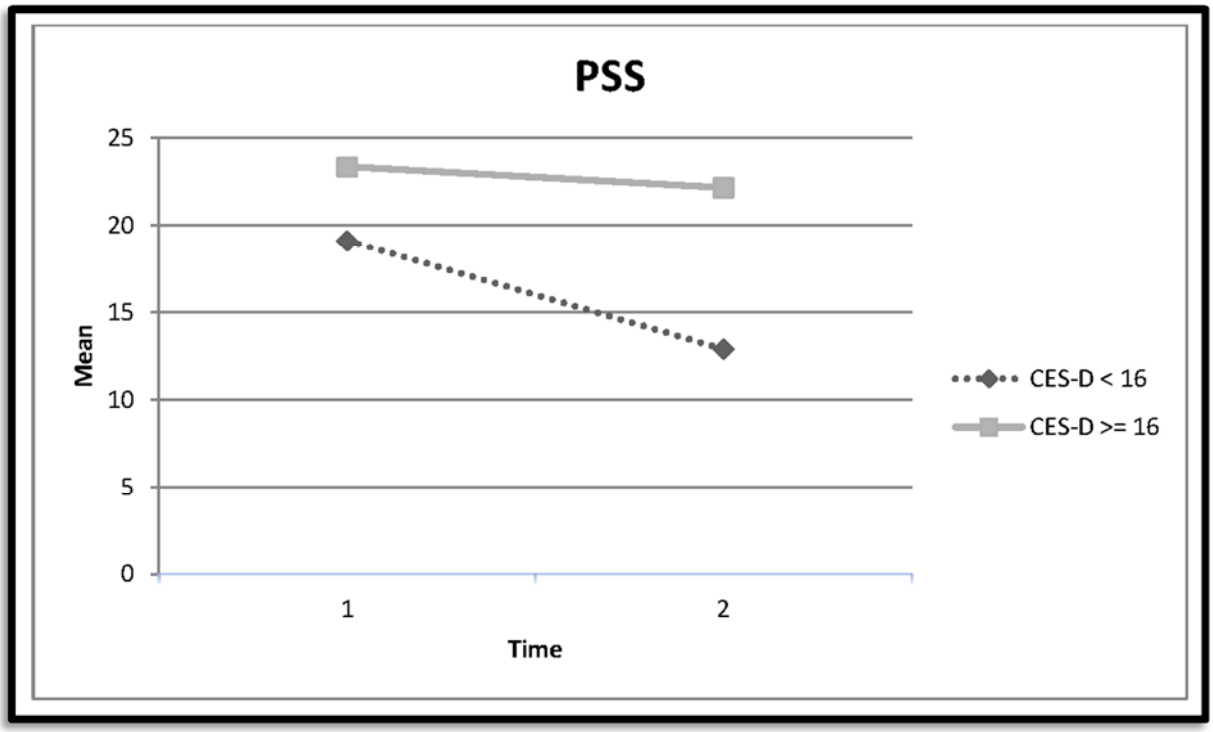


**Fig 1a** Means over time for post-MBSR depression subgroups for PSS

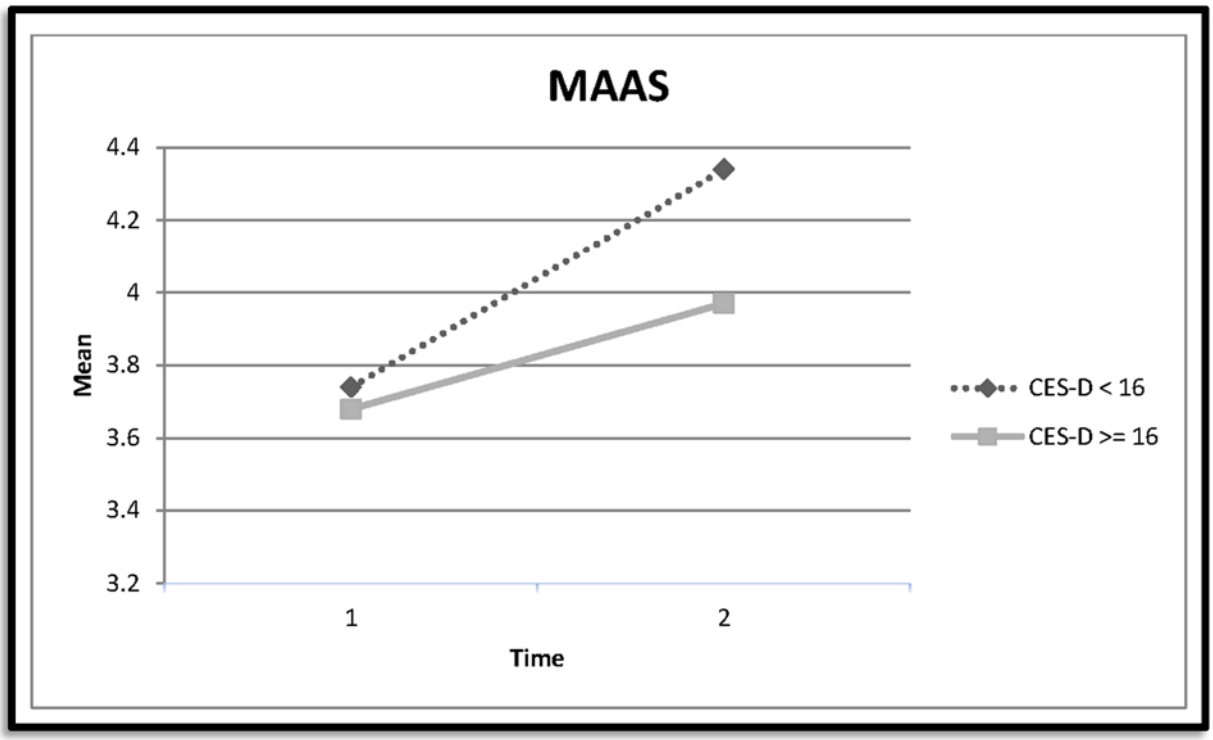


**Fig 1b** Means over time for post-MBSR depression subgroups for MAAS

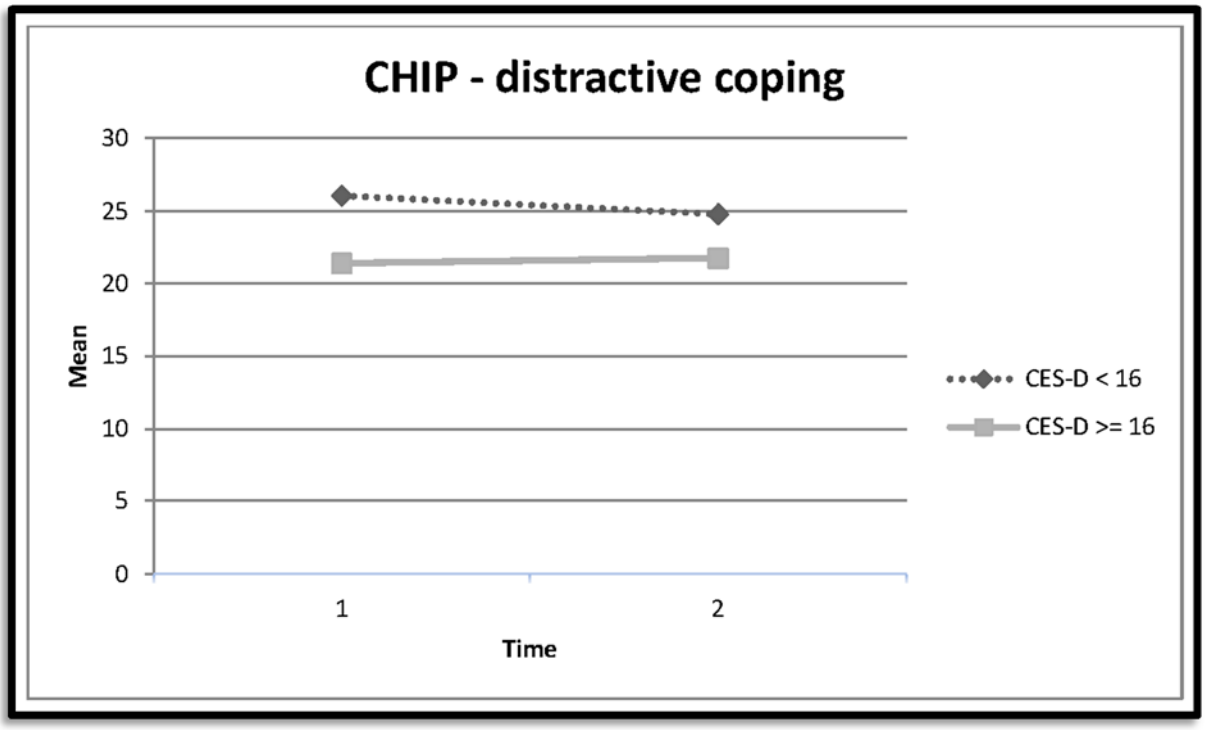


**Fig 2a** Means over time for post-MBSR depression subgroups for CHIP subscales

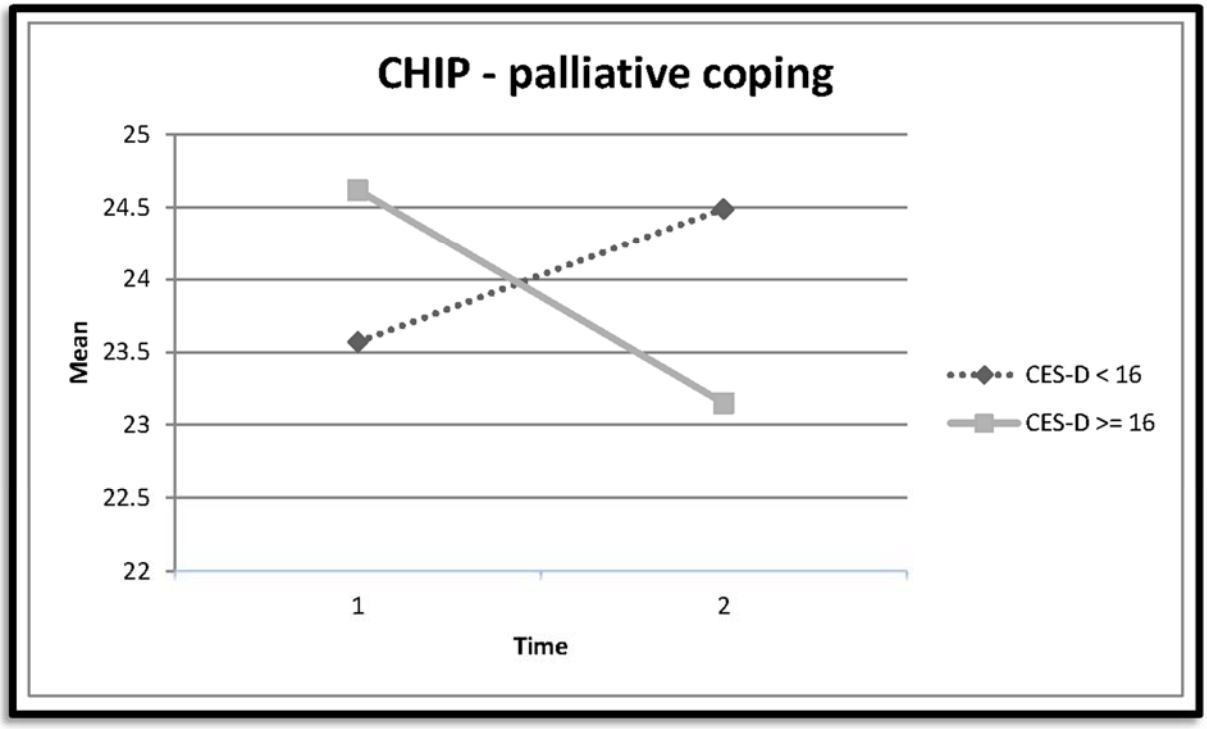


**Fig 2b** Means over time for post-MBSR depression subgroups for CHIP subscales

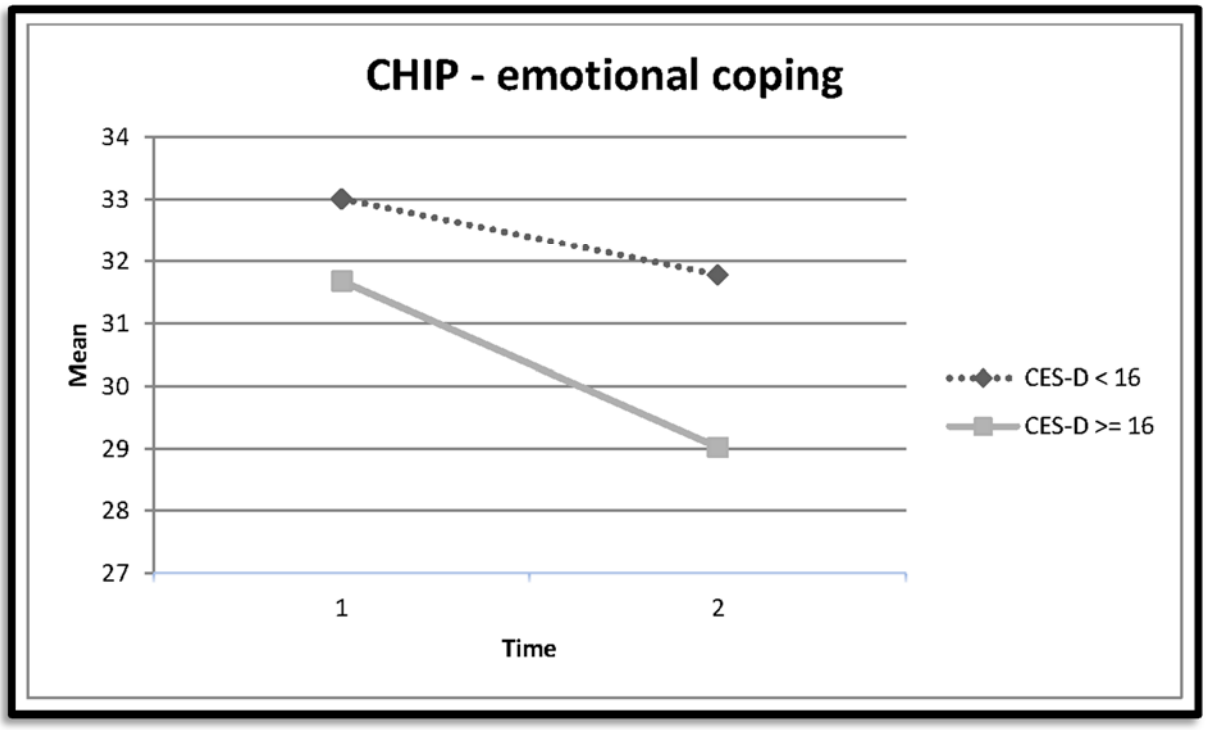


**Fig 2c** Means over time for post-MBSR depression subgroups for CHIP subscales

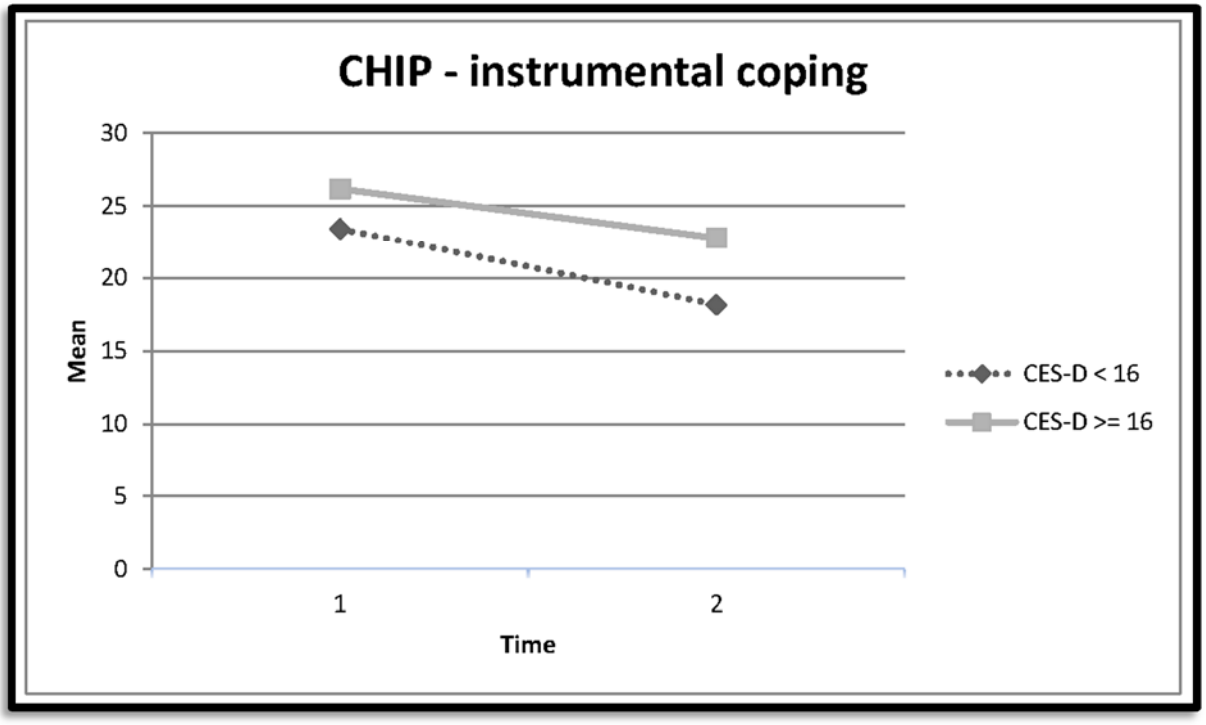


**Fig 2d** Means over time for post-MBSR depression subgroups for CHIP subscales

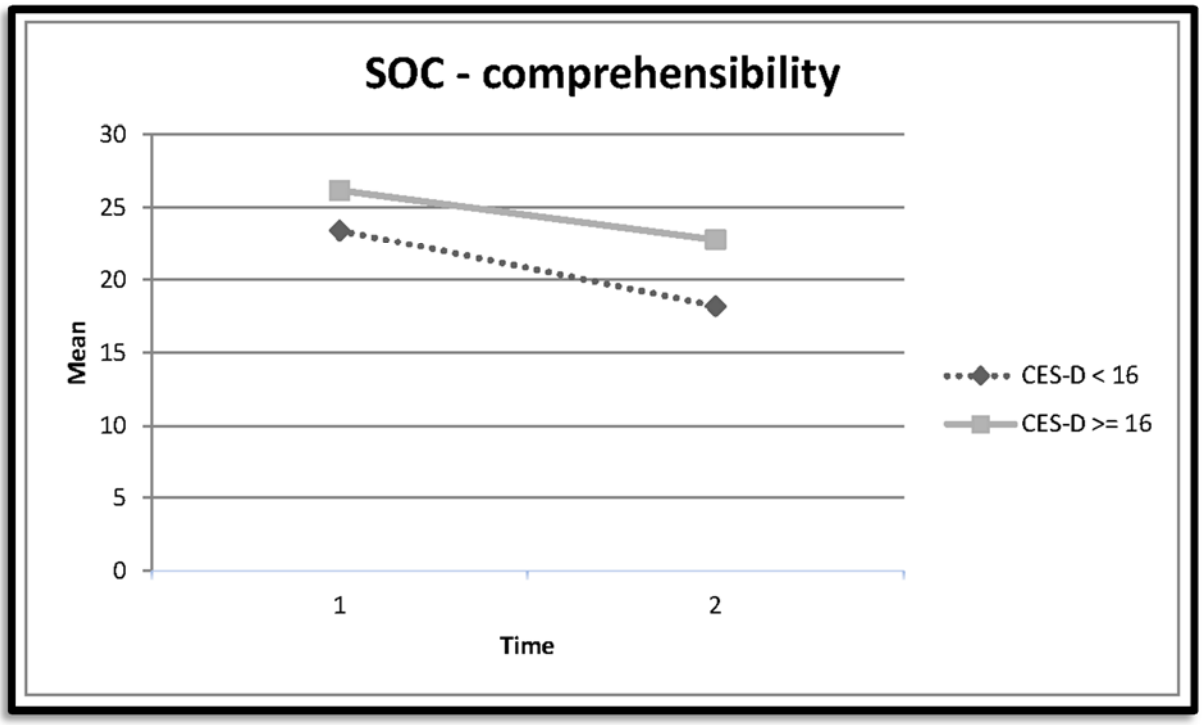


**Fig 3a** Means over time for post-MBSR depression subgroups for SOC subscales

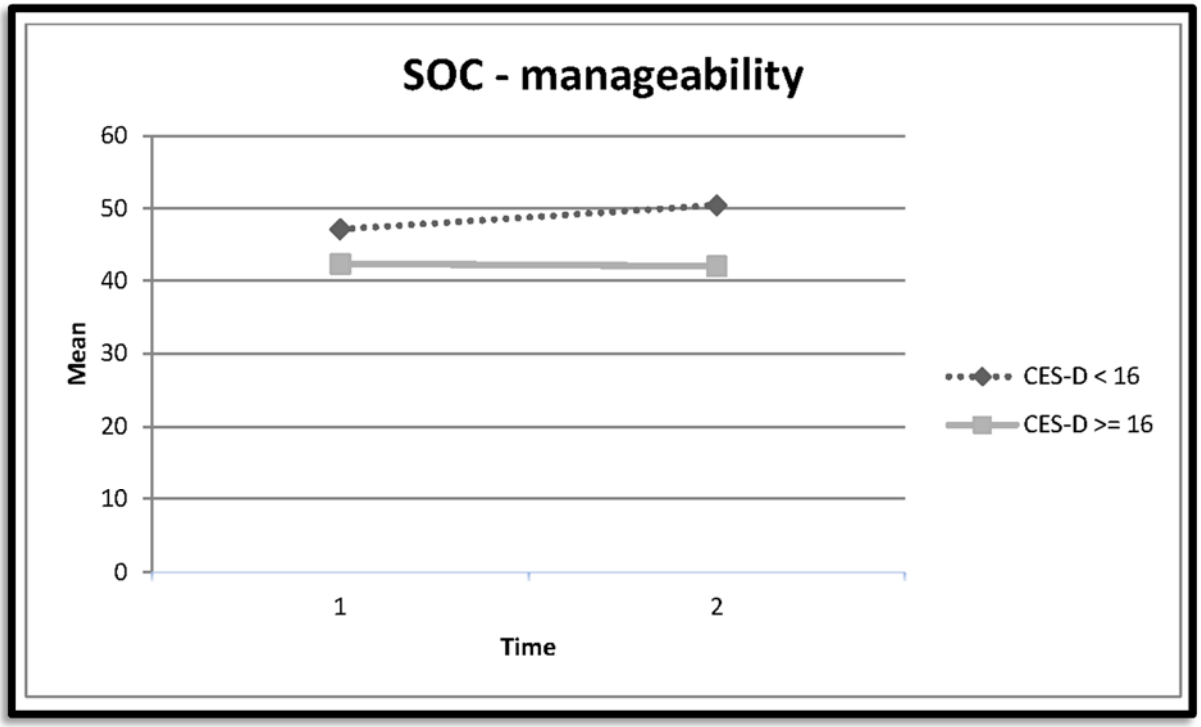


**Fig 3b** Means over time for post-MBSR depression subgroups for SOC subscales

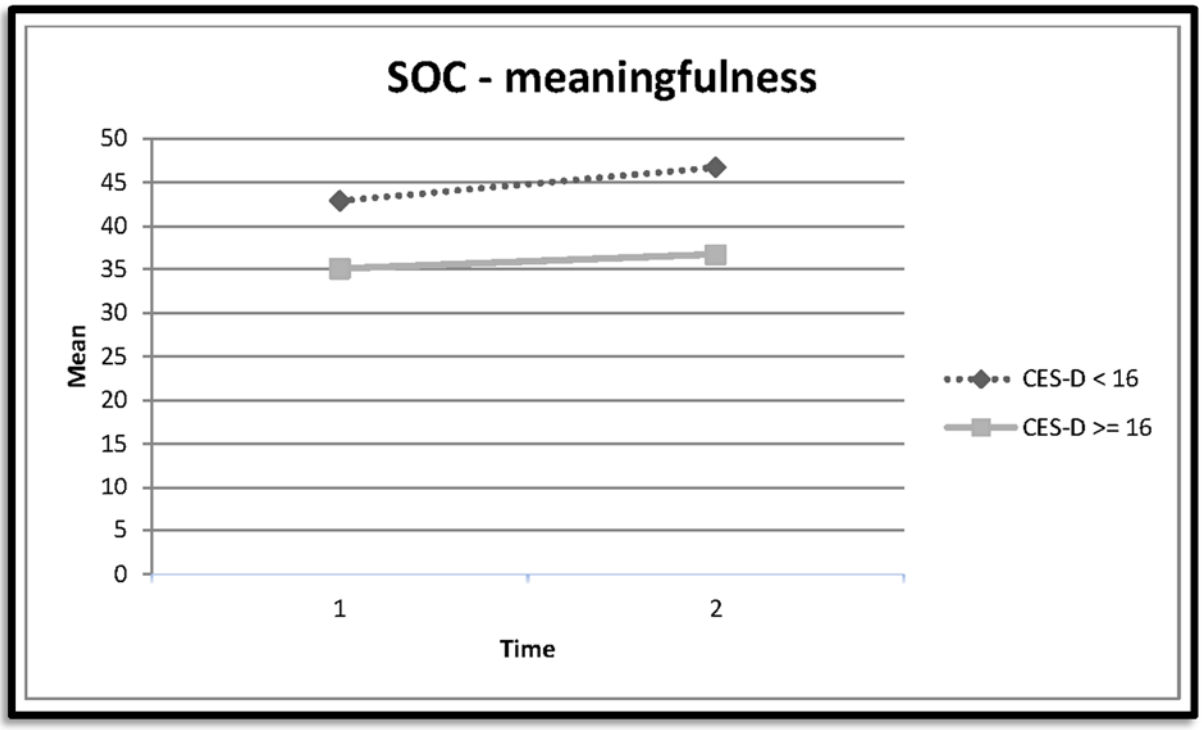


**Fig 3c** Means over time for post-MBSR depression subgroups for SOC subscales

Multiple linear regression analyses were performed using baseline CES-D as a continuous variable and PSS, CHIP subscales, and SOC subscales as putative predictors. Only the SOC subscale meaningfulness was significant in both forward and backward models. Using the forward method, the adjusted $R^2 = 0.28$, $F(1,124) = 50.02$, $p < 0.001$, and $\beta = -0.54$. Using the backward method, the adjusted $R^2 = 0.29$, $F(2,123) = 26.91$, $p < 0.001$, and $\beta = -0.45$. Higher meaningfulness before the course predicted less depressive symptoms after the course.

As shown in Table 5, Pearson's correlation coefficients were calculated between MAAS change scores and PSS, CHIP, and SOC change scores. For the depressive group, only the SOC meaningfulness change score was significant ($p < 0.007$), whereas for the non-depressive group, there were significant correlations at the $p = .01$ for: stress, emotional coping, and the three subscales of the SOC.

| Variables | Depressed (*n*=34) | Non-depressed (*n*=92) |
|---|---|---|
| **PSS** | -.22 | -.48** |
| **CHIP** | | |
| Distractive coping | .31 | .22* |
| Palliative coping | .17 | .06 |
| Instrumental coping | .03 | .20 |
| Emotional coping | -.27 | -.38** |
| **SOC** | | |
| Comprehensibility | .27 | .45** |
| Manageability | .31 | .35** |
| Meaningfulness | .46** | .47** |

**Table 5** Correlation between MAAS change score and outcome variables

*Correlation is significant at the 0.05 level (2-tailed).
**Correlation is significant at the 0.01 level (2-tailed).

## Follow-Up Questionnaire

When asked participants to rate the course overall and found that there was little difference between groups. Their scores of 8.6 and 9.1/10 (depressive and others, respectively) indicated that they were satisfied with the course. The top three course components rated as important for the depressive patients were: awareness of breath, yoga (with CD), and retreat day; for the comparison group, it was: awareness of breath, retreat day and yoga (with CD).

## DISCUSSION

There is a burgeoning literature examining processes through which patients benefit from mindfulness-based interventions[25-28]. For example, in a comparison of MBSR, MBCT, and Zen meditation, Marchand[10] presents psychological mechanisms proposed to underlie improvements. “Reperceiving” (a fundamental shift in perspective such that one is able to step back from, and be less identified with one’s own thoughts and emotions) is purported to be one way that becoming more mindful can reduce distress[29]. This notion was supported in a qualitative study of MBSR participants’ diary entries in a small community sample of women[30] as well as an examination of a subset (n = 13) of the cohort in the present study[31]. Equally important may be reductions in self-referential thinking, especially narrative self-reference that perpetuates negative self-judgments and dsyphoria[32]. Several studies have shown that increases in mindfulness are associated with decreases in rumination[33-35] and increases in mindfulness have been hypothesized to moderate outcomes (e.g. stress reduction)[28]. For example, in a study of physicians and health care professionals increases in self-compassion and mindfulness both independently predicted well-being[36].

The full sample in the present cohort showed significant improvements on outcome measures (stress, depression) and process measures (mindfulness, sense of coherence, and coping)[16]. While the comparison group improved on stress the depressive group remained highly symptomatic at both times.

Palliative coping changed in opposite directions for the two groups. If one considers palliative coping as an expression of self-compassion then this finding is of interest as it has been suggested that self-compassion partially mediates the relationship between mindfulness and well-being[37]. The depressive patients decreased this approach from pre- to post-MBSR. As for the other coping strategies, those who reported more depressive symptoms had significantly lower scores on distraction and higher levels of emotional coping at both time points. Distraction coping assesses actions and cognitions that are aimed at avoiding preoccupation with the health problem (e.g. engaging in unrelated activities; being in the company of others). With emotional coping the patient focuses on the emotional consequences of the health problem; items include responses reflecting self-preoccupation and catastrophizing. With regard to sense of coherence, those with depressive symptoms were significantly lower at both times. Thus, they perceived themselves to be overwhelmed by life and coped poorly with the challenges they were facing.

Results from the regression analysis indicated that meaningfulness was the sole predictor of depression (as a continuous variable). Garland et al.[29] provide a plausible interpretation for this finding. When a person can reappraise a stressful event as being meaningful (e.g. a cancer survivor views the illness experience as a "wake-up call"), then negative emotions can be regulated more effectively. In their study of 339 patients who took MBSR it was shown that the stress-reductive effects of increases in mindfulness were partially mediated by growth in positive reappraisal. It would appear that patients in our study were unable to perceive stressors in another light, as reflected by high stress post-MBSR, emotional coping and lower scores on all subscales of the SOC questionnaire; this may have influenced their ability to regulate their moods.

Both groups increased over time on mindfulness but the depressive group scores were significantly lower than the comparison group post-MBSR. This finding may be important as mindfulness has been found to develop experiential self-reference, which is viewed as adaptive[10]. Those who ruminate engage in narrative self-reference and this is linked to affective disorders. The correlations between changes in mindfulness and outcomes differed by group as well. For the depressive patients, the only significant correlation was with meaningfulness. For the comparison group, increases in mindfulness were significantly related to changes in: emotional coping, stress, and all three subscales of the SOC measure.

Our findings suggest that MBSR may have limited benefits for some patients who are currently depressed and alternative approaches to mindfulness training may be considered. While MBCT appears the natural choice there are caveats to consider. MBCT was designed for patients whose depression was in remission

and results show that not all benefit in terms of relapse prevention[32,38]. Specifically, patients who had suffered less than two previous depressive episodes appeared not to benefit greatly[39, 40]. Yet, restricting MBCT to such patients has been disputed, with the suggestion that residual depressive symptoms, regardless of previous number of episodes may be improved[41]. Some patients in our group could be considered "treatment resistant" and adaptations of MBCT have been successfully used in such patients[42].

We do not know yet how to determine *a priori* who will benefit from which type of mindfulness-based therapy. Few studies have examined pre-program patient variables that may predict outcomes (e.g. mindfulness; Shapiro et al.[28]). Perhaps more time is needed to make changes to long-standing cognitive habits or specific exercises like those found in Cognitive Behavior Therapy (CBT) may be necessary. A broader question concerns whether mindfulness training of any kind is an appropriate therapeutic strategy for currently depressed patients. For some it may be more appropriate to use another form of evidence-based psychotherapy first and consider mindfulness training following remission of acute symptoms[5].

## Clinical Implications

Considering the current surge of interest in mindfulness training, referring clinicians should caution patients of the possibility of depressive symptoms arising. Additionally it may be appropriate to offer MBCT, CBT or antidepressant medication instead of MBSR, to patients with current depressive symptoms.

## Limitations

While we do not claim to have diagnosed patients, scores on the CES-D were elevated enough to suggest that for many, clinical depression may have been present. We did not have however, information on the number of previous depressive episodes or the treatments attempted pre-MBSR. Second, the way the high depressive symptom group was defined did not capture improvements among some patients whose scores were very high pre-MBSR and were reduced, albeit not below 16, post-MBSR. Lacking long-term outcomes, we cannot know if patients improve with time and more practice. Moreover, we did not collect data on home practice so we do not know if this varied by group or made a difference for outcomes. Finally, as is often the case with MBSR courses, there were relatively few men enrolled. This is partially due to the fact that the course was offered to women recovering from breast cancer.

## CONCLUSION

We recommend that the question who may feel worse and why following MBSR be considered. Moreover, how to help those who feel that life is meaninglessness needs to be contemplated. We do not advocate excluding patients on this basis as this may reinforce their low sense of coherence and perhaps cause harm. We need to reflect on how to assist them reappraise their lives or recognize and accept the fact that

finding meaning takes time and patience. This could be discussed during the pre-MBSR interview when scores on this variable are low.■

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