

## **Assessment of Mindfulness Based Cognitive Therapy for Cancer**

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### **Abstract**

Cancer causes much suffering and mindfulness interventions are increasingly recognised as being beneficial in reducing stress and increasing wellbeing. The main aims of this study were to examine the effects of a newly developed mindfulness course for the cancer context on measures of mindfulness, self-compassion, wellbeing, stress and sleep quality. Seven, participants were recruited, six post treatment, all female and took part in a one arm longitudinal study. The intervention consisted of an 8 week Mindfulness-Based Cognitive Therapy for Cancer course. It found significant pre to post intervention changes for self-compassion, wellbeing, stress, overall sleep quality, sleep latency and mindfulness facets of non-reactivity and observing. It also found changes close to significant for mindfulness facets of acting with awareness and non-judging and for subjective sleep quality.

At three months follow up after the course, it found significant changes compared to baseline for wellbeing, stress and all mindfulness facets except for describe. Improvements close to significant were found for self-compassion with overall sleep quality significant at a lower level.

Overall this study shows evidence consistent with a positive effect on stress and wellbeing, with shorter term effects on sleep quality, through participation in an MBCT-Ca course. Future large scale studies are recommended to confirm findings and examine novel aspects of the course.

## **Introduction**

### **Cancer is Significant, Causes Suffering and is Growing**

Cancer is a significant cause of mortality and morbidity in the UK and globally (Jemal, Bray, Center, Ferlay, Ward, & Forman, 2011). Whilst research shows there can be some positive growth from a cancer diagnosis (Levesque & Maybery, 2011) the condition triggers much suffering such as stress, anxiety and depression, for both the sufferer, their family, friends and carers (Birnie, Garland & Carlson, 2010). The UK is estimated to have over 2 million cancer survivors (Maddams, Brewster, Gavin, Steward, Elliott, Utley & Møller, 2009), with incidence rates (Cancer Research UK, 2012) and survival rates increasing (Office for National Statistics, 2012) this figure is expected to increase further.

Cost effective methods of alleviating suffering are important to identify and deliver given the current climate of financial austerity.

### **Mindfulness: Definition and Effects**

Mindfulness is a growing field and therapeutic approach which seems to enjoy positive effects across a variety of conditions (Didonna, 2009). Mindfulness courses typically consist of 2 ½ hour weekly sessions for 8 weeks, and include a variety of awareness meditation practices which include movement (Kabat-Zinn, 2004).

The common definition as intentional, non-judgemental present moment awareness (Kabat-Zinn, 2011), has been rejected as a complete operational definition by its author (Kabat-Zinn, 2011) suggesting that from Mindfulness' roots in Buddhism, it is akin to universal teachings, "Buddhadharma" (Kabat-Zinn, 2011, p. 290), for the alleviation of suffering and that "in some sense the whole book (Kabat-Zinn, 2004) is a definition of mindfulness" (Kabat-Zinn, 2011, p. 291).

Other definitions exist within Buddhism, from the Pali word “sati” translated as “bare attention”, or “sati- sampajanna”, meaning mindfulness and “clear comprehension”, (Nyanaponika, 1962, p32) where it takes on a more “skilful” awareness, to other places where it appears as an invitation to develop and maintain one’s kindness, (Nanamoli, 2012). This variety makes measuring it difficult, complicates research and has attracted critique (Grossman, 2008). It also complicates the teaching of it.

### **Relevant Literature**

A review (Wood, Giles, & Percy, 2009) of the literature was conducted to better understand the field of mindfulness. The literature search process is first outlined; results from this process are detailed and discussed thereafter.

A formal systematic review process was not entirely followed so as to overcome some of the limitations in exploring broad initial questions (Gysels & Higginson, 2007), but systematic elements were used as appropriate, e.g. including search dates. The review process started with key texts (Didonna, 2009; Kabat-Zinn, 2004; Segal, Williams, & Teasdale, 2002) to clarify key concepts and establish an overall picture, with key references identified from these. Following this, searches were made, using Bangor University search tools, to identify additional relevant journal articles. Systematic reviews were sought which particularly referenced Randomised Controlled Trials (RCTs) using key terms such as “systematic review mindfulness” and “randomised control trial mindfulness”. Attention was paid to the quality of these reviews in addressing publications bias, selection criteria and ensuring review questions were focused.

This initial broad search outlined the context of Mindfulness research and revealed tailored courses for specific populations and some general issues. A more

focused search then examined Mindfulness research within the cancer context. This also followed a systematic approach building on references from core texts in Mindfulness and Cancer, e.g. Bartley (2012) and Didonna (2009). Utilising relevant search terms within University and Internet search engines further systematic reviews containing RCTs were traced. Search terms included “systematic review Mindfulness cancer”. Websites of prominent figures in the research were also visited for details of more recent research. This helped to understand the use of mindfulness within cancer and identify some tailored courses for cancer patients.

A relatively new course Mindfulness Based Cognitive Therapy for Cancer (MBCT-Ca) (Bartley, 2012) was identified as having no research surrounding it. This was confirmed via experts familiar with research in this specific context including the author of a previous systematic review. MBCT-Ca was then briefly explored to understand its theoretical framework and literature searched to identify any studies examining the underlying cognitive model.

## **Search Results**

This section starts by examining the evidence for mindfulness courses in a general context, then examines the value of tailored mindfulness courses to specific populations. It goes on to examine the value of un-tailored mindfulness courses with no cancer specific cognitive model in the cancer context and then discusses tailored mindfulness courses for this context, ending with a brief description of qualitative findings.

### **Mindfulness courses for general populations.**

Evidence for the efficacy of mindfulness courses in general are found in a number of reviews. One systematic review of 21 RCTs by Fjorback, Arendt, Ørnbøl, Fink & Walach (2011) examines 17 Mindfulness Based Stress Reduction (MBSR)

and 4 Mindfulness Based Cognitive Therapy (MBCT) studies that had a minimum of 33 participants per sample and concluded that evidence supports that MBSR improves mental health in clinical and non clinical populations, in terms of stress, anxiety, and depression, with less clear evidence for effects on physical health but that it was a helpful complement to medical treatment in bolstering wellbeing and reducing distress. Effect sizes were in the medium range and improvements seemed to be in line with other treatments including CBT. However, the quality of most MBSR RCTs, within this review, was weak in not having an active control, nor specific details of the actual mindfulness course itself and none of the studies involving non-clinical populations had longer term follow up over 4 months. Despite this, it displays evidence for the short term effectiveness of mindfulness based courses in general contexts.

#### **Tailored courses for specific populations.**

Evidence supports the use of tailored courses for specific populations. Teasdale, Williams, Soulsby, Segal, Ridgeway, Lau (2000) found, in a randomised controlled trial of MBCT, a significant reduction in depressive relapse at 60 week follow up of previously depressed patients, who had had 2 or more episodes of depression, compared with treatment as usual, alone. This was also replicated (Ma & Teasdale, 2004), and is consistent with other findings in Fjorback et al. (2011) which details other studies of MBCT with active controls showing at least as good an outcome as anti-depressant medication at 4 week follow up.

#### **Untailored courses in the cancer context.**

Evidence also exists to suggest that Mindfulness may help with depression and anxiety in the cancer context but various issues exist for generalising findings and comparing studies. A systematic review of 13 studies relating to cancer led Shennen, Payne, Fenlon, (2010) to conclude that “Mindfulness approaches are a promising

intervention” and that “different styles of mindfulness delivery are recommended”. The review looked at studies involving adult cancer patients published in 2000-2009 where mindfulness was the key component. 3 RCTs were included, two MBCT and one MBSR, which all found significant improvements in depression and anxiety post intervention. However these studies are hard to compare due to differing course types of MBSR and MBCT, uncertainty about the quality of mindfulness instruction; few details are given of the facilitators training and practice, differing control group treatments, which vary from active to wait list, and differing cancer stages and types with the most common being breast cancer. Participant demographics are also skewed with most participants being white, middle aged and well educated. Use of varying outcome measures further complicates comparison of results and a lack of long term follow up in all the RCTs from this review is limiting.

The largest study in this review (Foley, Baillie, Huxter, Price & Sinclair, 2010) delivered MBCT to 115 participants with mixed cancer types and used a wait list control. Significant improvements in mindfulness, depression, and distress were reported in the intervention group, all  $p < 0.001$ , with anxiety  $p = 0.002$ . These were sustained at 3 month follow up and the control group demonstrated similar gains upon receiving the intervention.

A more recent systematic review (Piet, Wurtzen & Zachariae, 2012) explored the effect of MBSR and MBCT on anxiety and depression in oncology settings. Despite limits of gender and cancer type, most being female and predominantly breast cancer, it provides additional evidence for mindfulness courses un-tailored to the cancer context being beneficial. The study looked at 9 RCTs with sufficient data to estimate effect sizes. It pooled data using the random effects model and found Hedge’s  $g$  effect sizes of 0.37 for anxiety and 0.44 for depression. With the exception of Cognitive-Behavioural Therapy it suggests these results are as effective or better

than other psychological therapies in cancer, such as group therapy or psycho-education, which showed only small to medium effect sizes in other systematic reviews (Sheard & Maguire, 1999 in Piet). Interestingly, only medium effect sizes were seen for improvements in mindfulness scores, variable instructor quality is given as a possible factor. Other limitations included the use of different instruments across studies and that only 4 of the RCTs had follow up data, limiting the power of the study.

### **Longer term effects in the cancer context.**

The effect of mindfulness interventions longer term is not clearly understood. Branstrom, Kvillemo & Moskowitz (2012) found less benefit at 6 month follow up, concluding that a continued meditation practice after an MBSR course was only associated with a reduction in post traumatic stress symptoms, although anxiety and depression symptoms were also measured. However, high attrition rates underpowered the study. Further, only 25% completed the full course with 28% of the participants attending less than 6 sessions, and generally regarded as insufficient (Segal et al., 2002). Wurtzen et al. (2012) found in a large RCT of 336 breast cancer sufferers followed up over 12 months that participants with higher levels of anxiety and depression at baseline showed a significantly greater decrease in the intervention group who received MBSR plus usual care, throughout follow-up. No differences were seen amongst least affected participants, compared to the control group who received usual care alone. This suggests that those with more significant symptoms may benefit more and may help explain Branstrom et al's., (2012) findings.

### **Qualitative studies in the cancer context.**

Qualitative studies in the cancer context with mindfulness courses have attempted to explore other dimensions, potential mechanisms and found beneficial themes. Mackenzie, Carlson, Munoz & Speca, (2007) using grounded theory explored

the subjective effects of MBSR with 9 participants with mixed cancer diagnoses and identified themes of opening to change, self control, shared experience, personal growth, and spirituality. However the participants had a long standing practice, which may be unrepresentative. However, these findings are similar to Dobkin's, (2008) findings in a study with 13 post treatment breast cancer survivors.

### **Mindfulness courses tailored to the cancer context.**

Mindfulness courses with cancer specific cognitive models have not been discussed so far and two were found; Mindfulness Based Art Therapy (MBAT) (Monti et al., 2006) and Mindfulness Based Cognitive Therapy for Cancer (MBCT-Ca) (Bartley, 2012). A third course Mindfulness Based Cancer Recovery (Carlson & Speca, 2010) did not seem to offer a significant addition to the standard MBSR stress reaction model, and was therefore not regarded as a specifically tailored course. The first two were explored further, and based on evidence for the underlying cognitive model within MBCT-Ca, theoretical elements were briefly explored and focused questions formed for a research study.

Mindfulness Based Art Therapy developed for cancer patients utilises an 8 week mindfulness course using art based exercises to facilitate expression of health threat representations. In an RCT Monti et al. (2006) found that anxiety and depression symptoms in a mixed population of 93 female cancer patients significantly improved for those receiving MBAT compared to wait list controls ( $p < 0.05$ ), and that this improvement was maintained at 16 week follow up. However, control group data at this follow up is not available, on account of their receiving the intervention at week 9; which limits the certainty of the conclusion to be attributed to the course. The study used the Symptoms Checklist 90 revised (Derogatis, 1994) and Medical Outcomes Study Short Form Health Survey (Ware, 1999). Dimensions of hostility, interpersonal sensitivity, obsessive compulsivity, somatisation, and sleep quality also

significantly improved as did general health, mental health, vitality and social functioning as measured by the SF-36 questionnaire. However, the study is limited in not having an active control and in not detailing how potential biases were handled; as an investigator was also the instructor. The study remains interesting, however, in suggesting novel methods of delivery and alternative theoretical frameworks for the cancer context may be helpful; in this case self regulation theory (Monti et al., 2006). The additional dimension of sleep quality is also welcome as this is a common issue with oncology patients (Carlson & Garland, 2005).

No published or unpublished research was found regarding MBCT-Ca. One proposed RCT was identified, a cost effectiveness study which aimed to begin recruiting 120, recently post treatment participants, in November 2012. (Bryning, Edwards & Crane, 2013). Further details of pilot studies were requested but not available.

In the absence of research studies into MBCT-Ca, its theoretical components were briefly explored and revealed three areas. First, a cognitive model, along with cognitive and behavioural elements, secondly, mindfulness and third, compassion. Other themes are also mentioned such as “intention” and “turning towards” and appear to be constructs to implement the theory. These are discussed briefly here and returned to in the discussion.

The cognitive model described behind MBCT-Ca suggests that during an initial adjustment phase patients typically fall into one of five adjustment styles. Those seeing it as a challenge are described as having a “fighting spirit” and typically have better outcomes (Watson , Greer, Young, as cited in Moorey & Greer, 2002), than those who focus on their inability to cope and who exhibit signs of “denial”, “fatalism”, “hopelessness”, or “anxious preoccupation”.

Hopelessness is associated with depression whilst anxious preoccupation with anxiety. The “vicious circle of anxious preoccupation” (Moorey & Greer, 2002, p. 124), suggests how on a background of anxiety, unpleasant body sensations such as pain can be negatively interpreted as signs that the condition is worsening, resulting in negative thinking and deepening anxiety, which spirals around again in a ruminative cycle getting worse each time. This is not dissimilar to the ruminative cycle described in models within MBCT for depression (Segal et al., 2002) and models of health anxiety (Hawton, Salkovskis, Kirk & Clark, 1989).

In adding mindfulness MBCT-Ca suggests this may be an agent by which people can begin to see these patterns, noticing cues of avoidance and the process of the ruminative spiral, experientially through awareness of present moment thoughts, feelings and body sensations. With practice one is then better able to “be with” experience rather than fueling it, which is similar to a mechanism proposed by Piet et al., (2012) and described by Segal et al., (2002).

This cognitive model is previously described by Moorey & Greer (2002) in more general terms discussing how cancer may be seen as a threat to self or as Beck described, threats to the “personal domain” (Beck as cited in Moorey & Greer, 2002, p. 15), which may have broader and more profound application, and this is explored further in the discussion section. Despite a lack of research surrounding MBCT-Ca the underlying cognitive model has some support. It is employed in Adjuvant Psychological Therapy (APT) for Cancer, an eight week problem focused behavioural therapy program which was investigated in an RCT with a mixed group of 47 cancer patients by Moorey, Greer, Bliss, & Law (1998). Their findings suggest that APT produced a significantly greater change post intervention than the controls, who received counselling, on “fighting spirit”, “helplessness”, “coping with cancer”, and anxiety, as per standard measures, and also in other participant-defined problems. At 4

months, the improvements over controls remained significant except for “helplessness”. Further follow up was unavailable due to low response rates but this provides some evidence for the intervention and perhaps the model behind it.

### **Role of compassion in MBCT-Ca.**

In addition to the cognitive model MBCT-Ca emphasises Compassion and Kindness as key attitudes participants are invited to develop, in order to acknowledge and “work with” difficulties, such as anger, denial or guilt. Sensitivity is also suggested as a requirement of the instructor to facilitate participants to face difficult and painful emotions.

Compassion has various definitions (Neff & Germer, 2012; Vajiranana, 1962) and is often used interchangeably, within MBCT-Ca, with kindness which has at its essence the opposite of anger (Vajiranana, 1962), whether self-directed, through harsh self-criticism, or more externally directed.

Recent research suggests that Compassion is a key factor in how MBCT for Relapse Prevention in Depression has its benefits (Kuyken, Watkins, Holden as cited in Bartley, 2012). Neff and Germer (2012) describe self-compassion to be comprised of self-kindness, a sense of common humanity and Mindfulness. In their RCT of community adults the intervention group receiving “mindful self-compassion” had significantly larger well-being scores compared to waitlist controls. Through their analysis it seemed a significant construct even controlling for changes in mindfulness. This may suggest that compassion is an important mechanism to consider for well-being and it’s relationship to mindfulness is discussed later.

### **Gaps in Research**

The previous material suggested several gaps in research. First, Mindfulness is not clearly defined, which makes measures of it variable and difficult to compare. It is also possible that current measures are missing possibly important but subtle aspects.

Secondly, research studies are limited by various factors including, lack of long term follow up, little investigation of sleep quality, population bias; most are with female, white, well educated, breast cancer populations, a lack of studies controlling for mindfulness, e.g. Educational courses without Mindfulness elements, similar to Williams et al., (2010). Designs typically don't mention any group specific bias, e.g. previous meditation experience or treatment stage of participants. Course specific details are often not included, such as course facilitator training and experience or whether sessions were didactically taught or exclusively experiential. Some recent guidelines exist to measure these (Crane, Soulsby, Kuyken, Williams & Eames, 2011) but evidence behind them is unclear and their adoption low.

Thirdly, there is currently no research regarding MBCT-Ca. In addition to a cognitive model and Compassion, MBCT-Ca appears to emphasise elements additional to typical mindfulness course formats. Brief examination of MBCT-Ca suggests dimensions such as “intention”, and “spaciousness/deep stillness”, which although not described in theoretical terms may be some elements that facilitate a shift from suffering to its alleviation. These are not typically measured and appear not to fit into the typical factors described by standard mindfulness (Baer, Smith, Hopkins, Krietemeyer, Toney, 2006) or self-compassion (Raes, Pommier, Neff & van Gucht, 2011) measures although they may be part of broader definitions of Mindfulness (Kabat-Zinn, 2011).

Fourthly, Kindness and Compassion are other significant terms in this field but poorly defined or researched.

From this, the following focused research questions for a feasibility pilot study were created. First, does MBCT-Ca increase Mindfulness and Compassion? And secondly, does it increase wellbeing, reduce stress, and improve quality of sleep? These were addressed using quantitative techniques described below.

## **Hypotheses**

H1: It is predicted that participation in an MBCT-Ca course will show an increase in mindfulness and self compassion scores.

H2: It is predicted that participation in an MBCT-Ca course will have positive effects on measures of individuals' wellbeing, stress and quality of sleep.

## **Method**

### **Intervention and Participants**

In this section "Course" refers to an MBCT-Ca course that ran at a community cancer charity, Paul's Cancer Support Centre, in London (the Centre) investigated as part of this research study (the Study). The Course followed that described in Bartley (2012). It was run by two instructors with extensive personal practice and experience of running mindfulness groups. One had a diploma level qualification in teaching mindfulness courses from the University of Bangor and had passed their assessment of teaching practice and had experience running several MBSR and MBCT courses.

The Course included an orientation interview which ensured participants were informed of course challenges allowing informed participation.

Inclusion criteria; the Course, was open to those with a previous diagnosis of cancer, and carers but carers were not invited alone unless they too had a cancer diagnosis in the past; to give priority to those directly affected.

Exclusion criteria included anyone without a prior cancer diagnosis. Psychosis, acute depression and a risk of suicide excluded acceptance on the Course, and therefore exclusion from the Study. Consent was required by the Course from all participants to contact their GPs in the event of serious concerns, failure would have led to exclusion.

Participants were recruited into the Study via referral solely from the Centre, Study details were not mentioned on any course promotional media, such as leaflets, or websites through which the Centre recruited participants for the Course.

Informed consent was gained through an email or letter (if email was not available) sent to participants, informing them about the Study. The email included a Participant Information Sheet (PIS) with contact details of the researcher for more information.

Those who were interested in participating in the Study emailed the researcher or informed him by phone. They then receive a separate registration form and consent form with a stamped addressed envelope (SAE) which they completed and returned to the Centre.

### **Measures**

The study utilised the following questionnaires where the Chronbach alpha statistic is provided below for their “internal consistency”. In part, measures were selected to minimize the burden of reporting for participants in the cancer context, as fatigue can be an issue.

Mindfulness was measured using the 39 question Five Facet Mindfulness Questionnaire (FFMQ)(Baer et al., 2006). Composed from 5 Mindfulness questionnaires with good internal consistencies, it offers a possible way of accommodating different definitions within Mindfulness. It has 5 dimensions, non-reactivity to inner experience, observing, acting with awareness, describing, and non-judging of experience, which have an average internal consistency of 0.85.

The short form of the Self-Compassion questionnaire (Raes, Pommier, Neff & Van Gucht, 2011) measured self-compassion changes with minimal reporting burden for participants. It has 12 questions with an internal consistency of 0.86 and very high correlations with the longer version.

The 5 point WHO-5 Wellbeing questionnaire (World Health Organisation, 1998) measured Wellbeing. Bonsignore, Barkow, Jessen & Heun (2001) found that this measure had medium internal and good external validity when tested in a population over 50 years in age. A Thai translation was found by Saipanish, Lokrakul & Sumrithe (2009) to have an alpha of 0.87.

Sleep quality was measured using the Pittsburgh Sleep Quality Index (PSQI) (Buysse, Reynolds, Monk, Berman & Kupfer, 1988), a 19 item measure that has been found to be easy to use and understand, with a high reliability coefficient, alpha = 0.83, and a high test-retest reliability with good validity.

Stress was measured using the Psychological Stress Measure-9 (PSM-9) (Lemyre & Tessier, 2003). It is a 9 item measure with an alpha of 0.85, and a test-retest stability between 0.68 and 0.8, convergent, divergent and concomitant validity has been demonstrated.

Finally, a demographic questionnaire captured age, gender, treatment status and previous meditation experience.

## **Design**

The Study was a pre-post one arm longitudinal study with follow up without a control group, collecting data at baseline pre-course, post-course finish, and at 3 months follow-up from the course end.

## **Procedure**

Study registration forms and information were stored securely. Participants were assigned numbers and used on all questionnaires to track Study participant data. A linking document was created to link personally identifying information to these numerical labels and held securely and separately from the completed questionnaires. This was only available to the researcher.

Study participants were sent questionnaires to complete for the baseline pre-

course data along with SAEs and a cover letter with suitable ethically worded instructions.

These questionnaires were either returned to the Centre via mail or brought to the first session of the course and handed in.

Failing to do so, participants were reminded by phone by a centre administrator, who is not linked to the research, to either return them before the second session to be included or exit the Study with no penalty.

At the end of the Course, Study participants were given the same set of questionnaires along with SAEs for completion within a week, those not doing so were reminded, as above, to return them within the following week or exit the Study with no penalty.

At three months after the end of the Course, participants received the same set of questionnaires by mail, with SAEs and the same instructions to return the completed questionnaires within 1 week. Those not doing so were reminded, as above, to return them within the following week or exit the study with no penalty. Participant debriefing was also planned.

### **Ethical Considerations**

The Study was conducted in an ethical manner aligned to British Psychological Society guidelines. Ethical approval was granted for this study by the Bangor University Ethics Committee. The Study did not set out to cause distress, offence, misguide or confuse. No significant issues arose but course instructors and counsellors at the Centre were available. Data was handled securely and confidentially, using an unshared computer with password protection. To avoid questionnaires causing distress, the PIS and questionnaire instruction sheet contained clear reminders that participants may omit questions that they were uncomfortable with.

The Study was conducted in a professional manner with the PIS containing contact details of the researcher and university in case of issue.

To avoid bias due to the researcher being a course instructor, measures were taken to avoid Course participants feeling pressured into the Study. Both an invitational email and verbal information emphasised that there was no expectation for things to be different, that they could effectively ignore the Study for the purposes of the Course and that their freedom to act in their own best interests was a priority at all times through the Course and the Study should they partake in it.

### **Data Analysis**

SPSS statistical software was used to analyse the data. A priori data analysis had intended to compare baseline with post intervention and follow-up scores of mindfulness and self compassion using paired samples one-sided t-tests and report effect sizes. Additionally, depending on study size the intention was to examine mediation effects of mindfulness and self-compassion scores with wellbeing, stress and sleep quality measures and moderation effects of demographic variables.

However, this was modified due to small sample size, t-test assumptions of a Normal or even symmetric underlying distribution were not reasonable with the small number recruited, (Dunn, n.d.) instead non-parametric post hoc one sided Wilcoxon Matched Pairs tests (Howitt & Cramer, 1997) were conducted on each measure to test the hypotheses pre to post intervention and pre to follow-up. Significance was set at 5%.

### **Results**

Raw data was processed according to questionnaire guidelines. Means and standard deviations for all measures are provided in Table 1. Results of the one-sided

Wilcoxon Matched Pairs tests comparing pre to post and pre to follow-up are provided in Table 2. Post to follow-up was additionally included.

Table 1

*Means and Standard Deviations for Pre Intervention, Post and Follow-up Scores for the FFMQ subscales, SCS-SF, WHO-5, PSM-9 and PSQI subscales and total.*

Questionnaire	Pre		Post		Follow-up	
	Mean	SD	Mean	SD	Mean	SD
FFMQ (N=5)						
Non-Reactivity	17.40	3.13	24.00	2.92	25.60	1.14
Observing	28.80	6.42	33.00	4.30	33.60	4.39
Acting with Awareness	21.00	5.10	28.20	3.63	29.60	3.85
Describing	28.20	10.38	29.40	7.70	28.20	6.83
Non-Judging	24.40	5.90	31.40	6.54	35.20	4.49
SCS-SF (N=7)	32.79	11.81	42.14	10.64	42.71	10.80
WHO-5 (N=7)	12.43	5.56	16.43	5.65	16.71	5.68
PSM-9 (N=6)	30.17	9.24	26.83	9.99	25.33	8.69
PSQI (N=6)						
Sleep Quality	1.25	0.76	0.67	0.52	0.83	1.17
Latency	1.50	0.84	0.50	0.84	0.83	0.75
Duration	0.67	1.03	0.33	0.52	0.33	0.52
Efficiency	1.17	1.17	0.67	0.82	1.00	1.10
Sleep Disturbance	1.83	0.75	1.67	0.52	1.67	0.52
Medication	0.00	0.00	0.00	0.00	0.17	0.41

*(Table Continues)*

Questionnaire	Pre		Post		Follow-up	
	Mean	SD	Mean	SD	Mean	SD
Day dysfunction	1.17	0.98	1.00	1.26	1.33	1.21
Total Sleep	7.58	3.32	4.83	1.72	6.17	3.19

Score

*Note.* Standard deviations are denoted by SD, sample size by N. Abbreviations for questionnaires are as follows: Five Facet Mindfulness:- FFMQ, Self-Compassion Scale (Short Form):- SCS-SF, World Health Organisation Wellbeing 5:- WHO-5, Psychological Stress Measure 9:- PSM-9, Pittsburgh Sleep Quality Inventory:- PSQI

Table 2

*T and p values for One Sided Wilcoxon Matched Pairs Test for Pre to Post*

*Intervention, Pre to Follow-up and Post to Follow-up for FFMQ Subscales, SCS-SF, WHO-5, PSM-9 and PSQI Subscales and Total.*

Questionnaire	Post - Pre		Follow-up - Pre		Follow-up - Post	
	T	<i>p</i> value	T	<i>p</i> value	T	<i>p</i> value
	FFMQ (N=5)					
Non-Reactivity	0	0.031	0	0.031	3.5	0.188
Observing	0	0.031	0	0.031	5	0.344
Acting with	1	0.063	0	0.031	4	0.250
Awareness						
Describing	4	0.250	5	0.313	5	0.344
Non-Judging	0	0.063	0	0.031	1	0.063

*(Table Continues)*

Questionnaire	Post - Pre		Follow-up - Pre		Follow-up - Post	
	T	<i>p</i> value	T	<i>p</i> value	T	<i>p</i> value
SCS-SF (N=7)	0	0.016	4	0.055	9	0.422
WHO-5 (N=7)	0	0.031	0	0.008	6.5	0.438
PSM-9 (N=6)	1.5*	0.047	0*	0.016	8*	0.328
PSQI (N=6)						
Sleep Quality	0*	0.063	2*	0.250	4	0.500
Latency	0*	0.031	0*	0.250	3.5	0.375
Duration	1.5*	0.375	3*	0.250	5**	0.687
Efficiency	3*	0.188	2*	0.500	1.5	0.375
Sleep Disturbance	0*	0.500	0*	0.500	0**	1.000
Medication	0**	1.000	0	0.500	0	0.500
Day dysfunction	2*	0.500	2	0.500	0	0.250
Total Sleep	0*	0.031	3.5*	0.094	2	0.250

### Score

*Note.* N denotes sample size, T is the smaller of the sum of positive or negative ranks. \* indicates value of sum of positive ranks suggesting scores decreased with time. \*\* indicates positive and negative sums were equal. Abbreviations for questionnaires are as follows: Five Facet Mindfulness:- FFMQ, Self-Compassion Scale (Short Form):- SCS-SF, World Health Organisation Wellbeing 5:- WHO-5, Psychological Stress Measure 9:- PSM-9, Pittsburgh Sleep Quality Inventory:- PSQI

### Participants

The study recruited 8 participants, completed questionnaires for one participant was lost and this participant then dropped out. The remaining 7 completed the study and returned questionnaires as required. Four participants attended all 8 sessions, one missed ½ a session, two missed 1 session, and one missed 2 sessions. All attended the “all-day” silent retreat.

## Demographics

All seven participants were female, six were post treatment for cancer, of these, four described themselves as currently well aside from monthly check-ups. One was awaiting diagnosis and one was awaiting prophylactic surgery following treatment. 2 participants were between 30-50 years of age with the remaining 5 being between 50-70. All except one had some previous mindfulness meditation experience.

## Mindfulness and Self-Compassion

Two participants were excluded from analysis of mindfulness scores due missing questionnaire data, as recommended by an author R.A. Baer (personal communication, November 18, 2013), data for the remaining five were analysed. Subscores for all five mindfulness facets, non-reactivity, observing, acting with awareness, describing, and non-judging, increased from baseline (M=17.40, 28.80, 21.00, 28.20, 24.40 and SD= 3.13, 6.42, 5.10, 10.38, 5.90) to post (24.00, 33.00, 28.20, 29.40, 31.40 and SD=2.92, 4.30, 3.63, 7.70, 6.54) with significance found for non-reactivity and observing  $T(N=5)=0$   $p=0.031$ , and close to significance for acting with awareness  $T(N=5)=1$   $p=0.063$  and non-judging  $T(N=5)=0$   $p=0.063$ . Scores showed significant improvement for all facets from baseline to follow-up except for describing (M=25.60, 33.60, 29.60, 35.20 SD=1.14, 4.39, 3.85, 4.49)  $T(N=5)=0$   $p=0.031$ . The non-judging subscale showed a near significant improvement from post to follow-up  $T(N=5)=1$   $p=0.063$ .

Self compassion scores increased significantly from pre (M=32.79 SD=11.81) to post (M=42.14 SD=10.64)  $T(N=7)=0$   $p=0.016$  and very close to significant from pre to follow-up (M=42.71, SD=10.80)  $T(N=7)=4$   $p=0.055$ .

This partially confirmed the alternative hypothesis H1 suggesting that participation in an MBCTCa course increases self compassion scores and at least 2 of the 5 mindfulness subscores upon completion and that at 3 month follow-up improvements from baseline affect 4 of the 5 sub-scores but not self compassion, using the 5% level of significance.

### **Wellbeing, Stress and Sleep Quality**

Wellbeing scores improved from baseline (M=12.43 SD=5.56) to post (M=16.43 SD=5.65) remaining improved at follow-up (M=16.71 SD=5.68). Statistical significance was achieved for both pre to post  $T(N=7)=0$   $p=0.031$  and pre to 3 month follow up  $T(N=7)=0$   $p=0.008$ .

Results for the PSM-9 scores, are based on 6 participants as one was excluded due to missing data. Improvements in stress scores were found both pre (M=30.17 SD=9.24) to post (M=26.83 SD=9.99) and pre to follow-up (M=25.33 SD=8.69) which were significant  $T(N=6)=1.5$   $p=0.047$  and  $T(N=6)=0$   $p=0.016$ , respectively.

Pre course sleep quality questionnaires were incomplete for one individual and they were excluded from the analysis. Data for the remaining six participants were included. sleep quality is scored out of 21; higher values indicating worse sleep. Global sleep quality scores for 5 of the 6 (83%) were scored above 5, pre intervention, indicating quality as “poor” (Buysse et al., 1988), post intervention this dropped to less than half, 2 of the 6, (33%) and were generally maintained at follow-up; 3 of the 6 (50%). Mean total sleep quality scores improved by almost 1 standard deviation from pre to post (M=7.58 SD=3.32 to M=4.83 SD=1.72) and was found to be statistically significant  $T(N=6)$   $p=0.031$ . Improvements from baseline were more modest at follow-up (M=6.17 SD=3.19) and change was only significant at the 10% level.

Improvements were found on all sleep subscales pre to post with the exception of medication which held its optimal value at zero before increasing marginally at follow-up ( $M=0.17$   $SD=0.41$ ). Pre to post the largest changes were seen in subscales of sleep quality, latency, duration and efficiency ( $M=1.25, 1.50, 0.67, 1.17$   $SD=0.76, 0.84, 1.03, 1.17$ ) to ( $M=0.67, 0.50, 0.33, 0.67, SD=0.52, 0.84, 0.52, 0.82$ ) respectively, improvements were reduced at follow-up ( $M=0.83, 0.83, 0.33, 1.00$   $SD=1.17, 0.75, 0.52, 1.10$ ) with the exception of duration which remained the same. The remaining two, sleep disturbance and day dysfunction showed modest improvements at post intervention ( $M=1.83, 1.17$   $SD=0.75, 0.98$ ) to ( $M=1.67, 1.00$   $SD=0.52, 1.26$ ), respective figures at follow-up ( $M=1.67, 1.33$   $SD=0.52, 1.21$ ) show that the figure for disturbance remained the same but that for day dysfunction increased to above the pre intervention value. Pre to post the only subscale change found to be statistically significant was for latency  $T(N=6)=0$   $p=0.031$ , with improvement in the “sleep quality” subscale, close to significant  $T(N=6)=0$   $p=0.063$ . Pre to follow-up analysis found no significant improvements in subscale scores at 5%.

These results provide short term support for the hypothesis H2, that participation in an MBCT-Ca course improves scores of wellbeing, stress and sleep quality, with only partial support at follow-up.

### **Discussion**

Results suggest that upon completion of an MBCT-Ca course significant improvements from baseline occurred in the mindfulness subscales of non-reactivity and observing with subscales of acting with awareness and non-judging showing improvements notably close to significant, however no significant findings were found for the describe subscale. Significant improvements in self-compassion scores

were found. This provides partial support for H1: the hypothesis that participation in an MBCT-Ca course would improve scores of mindfulness and self compassion.

Significant improvements were found in scores of self-compassion, wellbeing, stress, Overall sleep Quality and sleep Latency with the sleep Quality subscale close to significance. This supports H2: that participation in an MBCT-Ca course improves scores of wellbeing, stress and sleep quality.

Further, at three months following participation in the course significant improvements were seen from baseline in mindfulness subscores of non-reactivity, observing, acting with awareness and non-judging, again, no significant change was noted for the describe subscale, changes in self-compassion scores were notably close to significant. Over the same period, significant improvements for wellbeing and stress scores were found, with overall sleep Quality improving at a lower level of significance than set for this study. This suggests that from baseline to three months there is again partial support for H1: and partial support for H2:.

In general Mindfulness subscales increased in line with previous findings of Mindfulness courses based on MBSR in the cancer context (Branstrom et al., 2010, 2012) with post treatment populations. However, some differences exist. First, with the exception of the describe subscale, changes in mindfulness subscales from baseline to three months reported in this study are close to double that found by Branstrom et al., (2010, 2012) at one month or 4 months post intervention despite similar standard deviations. Several factors may explain this.

The small sample size may be unrepresentative of the broader population. Whilst participants in the MBCT-Ca study were similar in age, gender and treatment status, with none undergoing active cancer treatments, all but one had some prior meditation experience. This may point to a more motivated population with greater

engagement in the course. However, baseline values are typically lower and standard deviations very close between these studies, for the facets being discussed, suggesting perhaps little prior mindfulness practice although it is possible that participation invoked latent skills, previously developed. Other characteristics about the population in Branstrom et al., (2010) may have affected changes in scores, e.g. over 32% used antidepressants, it is not clear if their use or the underlying condition affected scores or if of other psycho-pathologies and treatments within that population did.

Alternatively, it may point to benefits within MBCT-Ca. The course contains a variety of specific changes that may address the specific vulnerabilities (Crane, 2009) of those in this context, such as shorter, less demanding practices, different session components such as the “sea of reactions” which participants report help normalise, and legitimise, how they really feel, action plans for difficult times and a cognitive model, discussed later. New teaching structures such as the ‘four movements’ (Bartley, 2012) including Intention emphasise kindness and consideration is also given to the group process. As a result engagement with the course may be higher and content more accessible.

Differences in the Branstrom et al., (2010) mindfulness course may explain findings, there was no “day” silent retreat, sessions were ½ hour shorter, and on average participants attended fewer sessions and unlike this MBCT-Ca course, participants were not interviewed prior to joining. Consequently they may have had little idea of course demands and its suitability. These factors may have affected participants connection to the course content, trust with the instructor, group or the course may have been inappropriate.

The effect of instructor skill and training may also be a factor, the Branstrom et al., (2010) study had less personal mindfulness experience, less formal mindfulness

teacher training and much less experience in running MBSR courses, not having run any before and may have impacted their ability to embody mindfulness, work skilfully with course themes, utilise present moment experience to effectively illustrate teaching points and connect participant to their practice

The amount and type of home practice might have played a part; Carmody & Baer (2008) found that the amount of formal home practice e.g. Sitting, movement, correlated significantly for mindfulness facets except for describe in an MBSR study with a mixed symptom population.

Finally, location may have played a part as the MBCT-Ca course was conducted in an environment designed for healing and non-judging.

The second difference is the marginal shift in the describe facet. This may be explained by the very large standard deviation but it is noted that both Branstrom et al., (2010) and Carmody & Baer (2008) have noted lower effect sizes for changes in the describe facet, the latter suggests that this is due to the lower emphasis within MBSR to the labelling of experience. This may explain the finding within MBCT-Ca as it shares much with MBSR, however it is also noted that pre values are already higher than the aforementioned studies, and a ceiling effect may be occurring.

Thirdly, the non-judging facet shows an unexpected improvement from post to follow-up that is close to significant, this raises questions about how facets change with time and may be an effect of follow-up session content.

MBSR studies with general populations have also reported significant changes in self-compassion scores (Birnie, Speca, & Carlson, 2010; Shapiro, Brown, & Biegel, 2007), using a similar and near perfectly correlated longer form of the questionnaire, however the magnitude is notably larger in this MBCT-Ca study by 1.3x and twice respectively, despite the second study including an additional kindness

practice. It is also more favourable than changes found with MBCT for depression (Kuyken et al., 2010). These findings may be explained by the greater emphasis within MBCT-Ca on themes of self-compassion such as kindness and common humanity. Significant correlations have been found between self-compassion and mindfulness as measured by the FFMQ (Robins, Keng, Ekblad, & Brantley, 2012) which may be reflected here.

Improvements in wellbeing scores were similar in their significance but more than twice as large as that from a larger RCT examining MBSR with post treatment breast cancer patients (Hoffman et al., 2012) and well into the clinically significant range for this measure (World Health Organisation, 1998) with these improvements maintained at follow-up. Explanations for this difference may be again due to those mentioned earlier for mindfulness. The Hoffman MBSR course was conducted by a clinician qualified to train two years prior, but details of the qualification are not clear, they also had only one previous experience of running an MBSR course. No details are available of the depth of their personal practice or skill as an instructor. Size of mindfulness groups in Hoffman et al.'s study are also larger than for that examined in this report. It's possible that participants had a more recent diagnosis in that study, but lower mean baseline scores in the MBCT-Ca study do not reflect this.

MBSR studies with cancer outpatients also report significant improvements in stress scores, Branstrom et al., 2010; Speca, Carlson, Goodey & Angen, 2000), although they use different measures that cover different time periods which may invalidate the comparison. Interestingly Branstrom et al., (2012) finds the changes in stress from baseline reduce at 4 month post intervention follow up compared to 1 month, differing from the MBCT-Ca study and may be explained by the low proportion of post intervention meditation practice reported there. Some mindfulness

facets are reported to also reduce and the mediation effects of mindfulness with stress, reported as significant at 1 months are not significant at 4 months follow-up (from course end). Although that study is underpowered, lack of post intervention practice may help explain it.

Changes in sleep quality agree with previous findings by Carlson and Garland (2005) in a mixed gender and cancer type population with an MBSR course, modified with less course time. The proportion of those experiencing “poor” sleep scores at baseline is slightly lower in the current study but a much greater proportion scored within the “good” range post intervention. Very high average baseline scores in that study may have demanded larger changes to move into the “good” range. However, the mean overall sleep quality score pre to post change was similar in magnitude and significant in both studies. Despite this, other factors such as those mentioned already for mindfulness need also to be considered, further, it is not clear how ‘linear’ sleep score changes are, e.g. marginal improvements may be harder to achieve as sleep quality improves, making the current study’s findings more interesting.

These studies also agree in finding the largest pre post changes in the subscales of subjective sleep quality, latency, duration and efficiency. With Carlson and Garland (2005) finding each of these significantly changed. The current study found a significant improvement in Latency, suggesting that on average participants took over 30 minutes to fall asleep before the course and less than 15 minutes after the course, which was sustained at follow-up. The subjective sleep quality subscale showed a close to significant improvement almost halving, and is of note as Shapiro, Bootzin, Figueredo, Lopez, & Schwartz (2003) suggests subjective complaints are more severe and persistent than objective measures. The duration subscale also showed a larger change compared to their study but the relatively high standard

deviation with the low baseline value may underpower the wilcoxon test, as several zero ties mean significance cannot be attained in a small sample. However, sleep duration seemed to improve from 6 towards 7 hours a night or more and that this was maintained at follow up.

Sleep efficiency also saw a large improvement pre to post, however gains reduced slightly at follow-up, on average people moved from efficiency in the 70% region to close to 80% post intervention and then 75% at follow-up. However, large standard deviations with a low mean may again suggest an underpowered test and limit meaningful comments.

Given that each of these subscales showed larger proportionate changes from baseline to other studies, other factors as mentioned already for mindfulness need to be considered. Carlson and Garland's (2005) study relates to an adapted version of the MBSR course with substantially less course time, but few other details about instructors experience or training is available and mindfulness measures were not used.

Both the data in this study and that by Carlson and Garland, (2005) showed that sleep Disturbance contributed the greatest to the total sleep score (less is better). However only marginal improvements were seen in both studies. Given that it measures more physiological factors not psychological, such as needing the bathroom, feeling hot or cold and difficulty breathing it may not be amenable to change through a mindfulness course. The subscale may also have a floor value of one as one episode of nocturia is regarded as within normal limits (Whitfield, 2006). Having said this Carlson and Garland found a significant change in sleep disturbance perhaps pointing to a lack of power in the current study. The medication subscale, measuring the use of sleep medication was not found to change significantly, at baseline and post no one

used medication for sleep, this did not significantly change at follow up. This appears atypical (Carlson and Garland) perhaps suggesting a skewed sample. Daytime dysfunction measured difficulty in staying awake during everyday activities and levels of enthusiasm to get things done. This subscore showed marginal improvement pre to post from an already low score, where on average issues occurred less than once a week, to even less, although these small improvements were not held at follow up. Carlson & Garland found significant improvements here, whilst the current study's relatively small mean with high variance may again point to an underpowered analysis. It's possible that the sleep disruption is affecting this subscore through sleep fragmentation (Mitty & Flores, 2008 ).

### **Mechanistic Explanations**

Mechanisms of mindfulness are currently unclear (Fjorback et al., 2011), theory suggests that mindfulness might have its effects through 'decentering' (Segal et al., 2002), or facilitating individuals to consciously choose thoughts, feelings and sensations without reacting to them Kuyken et al. (2010). The non-reactivity facet suggest this to be the case for inner experiences of thoughts and feelings and the significant change found in the current study suggests participants may, consequently, have an increased ability to notice ruminative spirals and exit them earlier, in accordance with the cognitive model within MBCT-Ca. This might have had an effect on measures of stress as this facets scores were found by Branstrom et al., (2010) to most strongly reduce post traumatic avoidance scores. However, these theoretical mechanisms are not measured by all mindfulness facets. The observe facet suggests an increased awareness of sensory experience but not necessarily a decentered stance to it (Bear et al., 2006). Branstrom et al., (2010) found this facet to be correlated to positive states of mind but not negative states, which may explain increases in the

wellbeing scores to some degree as people become more aware of pleasant sensory stimuli, but this does not require a ‘decentered’ stance and may suggest the opposite.

acting with awareness is associated with not being overwhelmed by experience

Branstrom et al. (2010), given the intensity of experiences cancer patients suffer, it may explain why significance was achieved for this only later at follow-up.

Mindfulness’ effect on cognitive reactivity is less than expected, but explained by an increased ability to be with experience (Kuyken et al., 2010), increases in the non-judging facet suggest this also occurs with MBCT-Ca and there is an overlap in this facet with concepts of self compassion (Raes et al., 2011). The mediation of low mood symptoms by self-compassion (Kuyken et al.) may suggest a protective effect of increases in self-compassion and non-judging, which may explain increases in wellbeing and reductions in stress. The interactions of the facets with self compassion is unclear, although correlations exist (Bear et al., 2006), and are unsurprising given definitions of mindfulness provided earlier. The previous discussion may also explain why mediation effects of Mindfulness with MBSR on psychological outcomes in the cancer context have been found (Branstrom et al., 2010). Although, since in the absence of stressors, wellbeing may be high and stress low without mindfulness, simple linear relationships are unlikely. Positive and negative affective states have been suggested as related but distinct constructs, (Branstrom et al.) which may explain why wellbeing measures increased disproportionately to scores of stress reduction.

These relationships may also explain why larger changes in Mindfulness and self compassion Scores reported in this MBCT-Ca study over previous studies led to proportionate increases in wellbeing measures but not stress. Causal relationships with sleep quality are even less clear, Carlson & Garland (2005), have suggested that MBSR may have triggered a physiological relaxation pathway or reduced rumination

and cognitive distortions which through moderation of stress or otherwise results in better sleep. This might explain the near significant improvement in subjective sleep quality that was found. However it is possible that complex interactions exist between each of these factors, for example involving circadian rhythms, which in turn influence mood, wellbeing and stress, perhaps even self compassion and mindfulness measures.

### **Theoretical Implications**

Benefits from MBCT-Ca may be from unique aspects of the course such as its cognitive model and how participants access the model. The course is noted to include several novel themes that can be seen from the “circle of suffering” and “the circle of presence” (Bartley, 2012, p. 245). A brief review makes apparent at least the following five constructs that are typically less emphasised in MBSR and MBCT programmes which rely more heavily on skilled instructors to cultivate them; Intention, Spaciousness or Deep Stillness, Heartfulness, Turning Towards and Common Humanity. These may sit within broader definitions of mindfulness but are not measured for specifically. They are important since they may be constructs through which effects occur. For example, “when kindness, generosity, love and wisdom motivate our intentions, then happiness follows” (Goldstein cited in Bartley 2012 p. 246) is expressed with respect to Intention which may point to a more compassionate, skillful, less aggressive attitude than “fighting spirit” often promoted (Moorey & Greer, 2002) in this context.

Further, the cognitive model was mentioned at the end of the introduction, stating that it was previously described by Moorey & Greer (2002) in more general terms discussing how cancer may be seen as a threat to self or as Beck described, threats to the “personal domain” (Beck as cited in Moorey & Greer, 2002, p. 15).

Where emotional responses are determined by *perceptions* of events as “adding to” or “subtracting from” one’s aspects of life which have direct relevance to the self. For example if a positive sense of self is based on a “felt” need to have a certain hairstyle and cancer treatments affect this, the emotional consequences can be large. A point made in MBCT-Ca is that the threat to life is only part of the sequelae of a cancer diagnosis, harsh treatment side effects and post operative body image issues are significant others.

Although a comparison hasn’t been made in the literature, it is a remarkable coincidence that mindfulness comes from a philosophy that highlights the importance of an identical concept and uses it for the alleviation of suffering, that of “view”(Nanamoli, 1991), the philosophy, in part, invites investigation into how our emotional difficulties are linked to trying to protect this view of self or “personal domain”, through various attachments, despite inevitable changes in life, like illness or old age. Further, it invites experiential exploration of “self”, through in part mindfulness, rooted in compassion, suggesting that cessation of suffering can be attained through experiential “insight” into suffering, impermanence and the clarity of what we thought “self” was. This may be relevant to existential threat or Palliative care, if handled compassionately and other contexts.

Buddhist theory lays out a set of strategies for optimising one’s “view” or attitudes to “personal domains” for the alleviation of suffering. As a result other constructs such as kindness, compassion, sympathetic joy and equanimity (Nanamoli, 1991) are additional practices that may help and are worthy of future exploration. Interestingly, they also resonate with the five additional themes mentioned above and compassion is already under investigation, although measures focus on self-compassion, with less focus on universal suffering.

Another main element of Buddhist theory is that of conditioned arising, (Vajiranana, 1962). which may complicate the relationship between Mindfulness and wellbeing by the arising of stress states within the mind and body due to previous conditioning. Perhaps, despite, increases in self compassion and mindfulness, that at times of acute severe perceived stress such as is typical in cancer, even post treatment e.g. when waiting for a check-up, prior patterns of reacting over-power the ability to respond skillfully. Imaginative and open-minded approaches are likely to be required to avoid the “erroneous reductionism” Grossman (2008) mentions as paradigms of cognitive psychology and eastern philosophy harmonise. This remarkable synergy may be a profound foundation to create a more universal teaching for the alleviation of suffering, or as Kabat-Zinn (2011), described “Buddhadharma”.

### **Practical Implications**

Although the study has a small sample size several scientifically significant effects were found and despite limitations, described below, this current study provides organisations working in the cancer context some tentative but important evidence supporting Mindfulness Based Cognitive Therapy for Cancer as a useful course in improving participants wellbeing, sleep quality and reducing stress. Additionally, sleep disturbance appeared a major contributor to poor sleep quality and would be worth exploring further with participants.

### **Limitations and Suggestions**

This study is limited in a number of ways. First, as a feasibility pilot, sample size is small and recruitment was limited by few available courses. As a result the study is likely to be underpowered and more prone to type II errors which misleadingly reduce the value of the course. Longer term studies are recommended to recruit sufficient participants and enable longer term follow up. Larger sample sizes based on a priori

power calculations are suggested to enable parametric analysis with effect size calculations and Mediator and Moderator analysis to explore relationships between variables. Small sample size is also less likely to be representative of the target population. In particular the sample was skewed in gender, treatment status, cancer type, age, colour and previous experience of meditation. As a result both the magnitude and significance of these results should be seen in this light. Other factors need to be considered such as education, income, ethnicity and especially treatment type to accommodate different side effects of various treatments. Studies are recommended to confirm and extend findings across these demographics for broader population application. Cancer is not limited to adults and variants of this course maybe beneficial to children. Early diagnosis, pre treatment, active treatment and Palliative care groups pose different challenges and studies or variants in these setting are also suggested. The study was not based on instructors who were trained psychologists but had extensive mindfulness training experience. Future studies are suggested that examine the effect of professional psychology training, mindfulness practice and level of experience in running courses. The study is also limited in design, no control arm was included so the contribution of extraneous factors to the results is unknown, in particular the nurturing environment, group effect, caring staff and instructors may have affected changes. More rigorous randomised control designs are suggested for the future to control for these. In particular comparison designs between MBSR and MBCT-Ca would highlight any actual advantage over standard courses. Dismantle designs would also be helpful to analyse the components of this course since it contains several new themes mentioned earlier and new measures may need to be developed for this. In response to critique of mindfulness self report questionnaires (Grossman, 2008), studies into associated constructs of “Personal

Domains” from Cognitive science and Buddhist theory may help create a more unified model of stress and it’s alleviation.

The study was limited in the measures used, additional measures to assess course materials and participant engagement are suggested. Constructs such as wellbeing and stress are complex, and additional measures would help explore the interplay and give a more precise picture of the challenges faced by participants in this context. Other measures may be required with greater sensitivity to smaller changes or to explore how mindfulness changes in the face of acute profound stressors, peculiar to this context. Measures of home and post intervention practice, are suggested to determine relationships between practice and psychological outcomes, and to improve follow-up session content.

This feasibility pilot study examined a new mindfulness course developed for the cancer context.

Whilst it contains a variety of limitations it found changes that were significant pre to post intervention for self compassion, wellbeing, stress, overall sleep quality, sleep latency and mindfulness facets of non-reactivity and observing. It also found changes close to significant for mindfulness facets of acting with awareness and non-judging and for the subjective sleep quality subscale of sleep quality.

At three months follow up after the course it found significant changes compared to baseline for wellbeing, stress and all mindfulness facets except for describe. Improvements close to significant were found for self-compassion with overall sleep quality significant at a lower level.

Overall this study shows encouraging early evidence consistent with a positive effect of participation in an MBCT-Ca course, future larger scale studies are recommended to confirm findings and examine novels aspects of the course.

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