***Supplement 1***

**Methods**

*Study Population and Recruitment*

The recruitment took place from 5 primary care centres from the Integrated University Health and Social Services Centres (CIUSSS-Centre-Ouest de Montréal) Catchment area, which provides health care for approximately 341,700 residents in Montréal, Québec, Canada [1]. Participants were recruited from the wait list for mental health services, their family doctor at a Local Community Service Centre (CLSC), and/or the CLSC where they received other mental health services. Initial contact with the patients was made through their treating family doctor/psychiatrist, nurse, social worker, psychologists or the clinic’s receptionist.

*Exclusion Criteria*

Participant were excluded if they presented acute psychotic symptoms, severe personality disorder/ unable to function in a group setting, acute suicidal ideations or intent, being unable to engage with MBCT for physical/ practical reasons, having hearing impairment not improved with hearing aids and/or sound amplification, and/or being unable to communicate in either English or French. Participants were also excluded once they reported changes in psychotropic medication during the 8 weeks of intervention and/or if they started attending weekly active and structured psychotherapy. Written informed consent was obtained from all patients. Patients who fulfilled selection criteria and filled up a written consent to the study were asked to fill out demographics and clinical self-report questionnaires (20-30 minutes). The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008. All procedures involving human patients were approved by the Jewish General Hospital ethics committee and was registered with the approval number in ClinicalTrials.gov (NCT02777905).

*Randomization and Blinding*

 Participants were assigned a coded number and randomized 1:1 (using randomizer.org) into two groups MBCT and treatment as usual (TAU). Randomization was performed by a third party not involved in assessment and recruitment. The outcome assessors and investigators were blinded to patients' group allocation, did not assist the MBCT intervention, and were not involved in the randomization. Both groups received regular treatment as usual with a primary care physician/treatment team during the study.

*MBCT Intervention Group*

The MBCT intervention involved weekly 2-hour group sessions for 8 weeks, based on the MBCT manualized protocol [2]. Participants were encouraged to try different mindfulness techniques during sessions (e.g. silent meditation, body scans, three-minute breathing space, gentle arm movements, chair yoga postures, guided meditations, and compassion meditations). Group discussions focused on reinforcing the guiding principles of mindfulness: awareness, non-judgment and acceptance. At the end of each weekly session, participants received a sheet with specific instructions on how to complete daily home mindfulness practices, learned during the MBCT group. Home practice consisted of roughly at least 15 minutes of seated meditation and 10 minutes of informal mindfulness (e.g. mindful: walking, brushing their teeth, eating) daily. In addition, participants received electronic reminders about their homework and a summary of home practice, with meditation CDs/online versions as support material. The therapeutic intervention generally followed the manualized protocol [2], with some adaptations made to accommodate the needs of older adult participants in the practice (see Appendix).

*MBCT Facilitators*

In this study, three trained facilitators delivered MBCT to 4 groups (6-12 participants in each group). The MBCT facilitator comprised of a pool of an occupational therapist, a fifth-year psychiatry resident and a social worker. These facilitators had received certification to facilitate MBCT (at the Centre for Mindfulness Studies and/or Sunnybrook Health Science Centre, Toronto, Canada) and had previous experience in running MBCT groups. Facilitators had between 1 to 7 years of meditation experience.

*TAU Control Group*

 Participants in TAU received treatment as usual or routine care in the primary care centre, which includes antidepressant medication and/or weekly or biweekly non-structure support counselling with a primary care team member (e.g. social worker, nurse, and/or psychologist). The TAU group was offered the 8-week MBCT intervention after the research intervention was completed and assessed.

*Outcome Variables*

The primary outcome examined changes in depression scores (PHQ-9) between baseline versus 8-week (follow-up) after the MBCT treatment. The PHQ-9 is a brief nine-item self-report scale for screening, diagnosing and measuring the severity of depression based on the DSM-5 criteria for major depressive disorder. Each of the nine questions is scored from “0” (Not at All) to “3” (Nearly Every Day), with a maximum score of 27. PHQ-9 scores of 5, 10, 15, and 20 are interpreted as mild, moderate, moderately severe, and severe depression, respectively [3]. The secondary outcome included a change in anxiety scores (GAD-7). The GAD-7 is a brief seven-item self-report scale for measuring the severity of anxiety that uses some of the DSM-IV criteria for generalized anxiety disorder. Each of the seven questions was scored from “0” (Not at All) to “3” (Nearly Every Day) with a maximum score of 21. GAD-7 scores of 5, 10, and 1 are interpreted as mild, moderate and severe anxiety, respectively. PHQ-9 and GAD-7 are well known reliable and validated questionnaires use to detect depression and anxiety in older adults in primary care settings; for both summed scores ≥10 are considered clinically significant [4, 5]

Feasibility and acceptability outcomes, of the MBCT intervention, were also measured. Feasibility was examined by assessing 1) the proportion of participants that were eligible who enrolled in the study (enrollment rate), and 2) the proportion of participants, from the intervention group, who completed at least 6 out of 8 sessions, measured directly after the intervention at 8-week (intervention completion rate). The acceptability examined the proportion of participants who completed the 8-week post assessments (study retention rate/ drop-out rate).

Exploratory outcomes measured changes in scores of the health-related quality of life using the EuroQol 5-D (EQ-5D) questionnaire assessed after the intervention ended. The EQ-5D is a reliable and validated five-item self-report that measures the health status of a person in terms of five dimensions; mobility, self-care, usual activities, pain/discomfort, and anxiety/depression. Each of the five dimensions was scored from “1” (No problems) to “5” (Extreme problems) with a maximum score of 25.

*Data Analysis*

Baseline demographic and clinical characteristics were compared between groups using chi-squared and two-sided independent t-tests. Primary, secondary and exploratory outcomes measured changes in PHQ-9 depression, GAD-7 anxiety scores, EQ-5D quality of life, and AIS quality of sleep, between baseline and at 8-week follow-up, were analyzed by comparing the median and mean of the intervention versus the control group using the Mann-Whitney *U*-test and a two-sided independent *t*-test as appropriate. Feasibility and acceptability outcomes were described using counts, means and percentages. Cohen’s *d* was used to measure effect size. We included all available participants’ data and made every effort to contact participants for 8-week follow-up assessments, including those participants who were randomized to the intervention group but did not complete the intervention. P<0.05 was considered significant in all statistical tests. The sample size recruited for this study (n=61) was enough to estimate effect sizes according to Birkett’s theory (at least n=10 in each arm), future sample sizes are needed for confirmatory randomized controlled trials [6]. Normality was assessed by using Shapiro–Wilk tests. Statistical analyses were performed using PASW Statistics 18 (Statistical Product and Service Solutions, Chicago, IL, USA).

***Supplement 2***

**Results**

 The participants who dropped out of the study included 5 assigned to the intervention and 3 to the TAU group. These participants reported that they: felt better (*n* = 1), found a job (*n* = 3), found the first session “too intense” and “stressful” (*n* = 1), died (not related to the intervention) (*n* = 1), not able to reach out (*n* = 1), and data was not available (*n* = 2) (***Figure 1***).Three of the twenty-six participants allocated to the intervention arm reported adverse effects such as “pain”, “rare and mild dizziness/a headache”, and “things come up in thoughts and flashback of traumatic events”. The rest of the participants reported positive effects about the intervention and the interventionists (e.g. “it helps me very much. I feel like I am cured” or “thank you for giving me this opportunity to experience moments of positive time through the day and new tool to use properly”).

*Primary and exploratory outcomes*

For our primary outcome, the MBCT group had a significant reduction in depression symptoms (PHQ-9) scores at 8-weeks compared to the TAU control group TAU (-7.9±4.4 vs. -4.0±4.7; U = 179.5, *p* = 0.002; *d* = 0.86). Similarly, anxiety symptoms (GAD-7) scores were significant reduced in the MBCT intervention group compared to the control group (-6.4±5.0 vs. -2.0±3.8; t(51) = -3.58, *p* = 0.001; *d* = 0.99). For our exploratory outcomes, the MBCT group had significantly improved quality of life (EQ-5D) compared to TAU (-0.6±3.5 vs.0.4±2; U = 241, *p* = 0.048; *d* = 0.35). (***Table 2***).

***Supplement 3***

*Extended limitations and future directions*

In this study, participants self-reported their home practice each week and they were responsible to complete the assignments. In future studies measurements of home practice could be useful to quantify the amount of mindfulness practice participants are engaging in the MBCT group. Facilitators may measure engagement in home practices by asking participants to complete an adherence sheet for each practice at home, filling up questionnaires regarding each practice or using technological approaches to track the homework. Although we were able to assess that MBCT was superior to TAU, future studies can assess the effects of different aspects of the intervention (e.g. the way in which groups are lead, adherence to meditation homework) on treatment outcomes.

In addition, due to the lack of an active control group we cannot to attribute the treatment effects observed in this study to the mindfulness component of the MBCT. Future MBCT studies may measure mediating variables such as change in mindfulness (e.g Five Facet Mindfulness Questionnaire) which may potentially balance and mitigate to some extent the lack of active controls.

Although the self-report assessments (PHQ-9 and GAD-7) used in this study to measure depression and anxiety symptoms were feasible and easy to implement in primary care, these self-report questionnaires may be prone to social desirability bias. In future studies, a more formal systematic diagnostic evaluation (e.g. Hamilton-D) could be implemented to investigate comorbidity and formal diagnosis. In addition, since unspecific group therapeutic factors may have a curative effect [7], future studies may take into account those effects (e.g. using the Therapeutic Factor Inventory) [8] when assessing the beneficial effects of MBCT for older adults.

***Appendix***

*Adaptations and Modifications of the MBCT Sessions for older adults*

Some adaptations were made in this study to facilitate the intervention for older adults. Main adaptations included: 1) reducing time of body scan meditation to a maximum of 20 minutes, compared to 30 minutes for the general population, 2) using chairs rather than yoga mats or the floor during meditation practices (although yoga mats were available), 3) allowing patients to remain seated during yoga practices, rather than standing or lying, and performing a modified version of sun salutation in the chair, 4) encouraging patients to modify postures to promote well-being and safety, 5) providing pillows to promote comfort while seated in chairs or lying on the yoga mats, 6) slowing down the pace of walking meditation to avoid falls, 7) projecting loudly when guiding discussion or meditation practices in order to facilitate hearing, or having facilitators sit near those who could not hear/understand well, and 8) taking more frequent breaks.

**Supplemental Figure 1.** Participants flow over the course of the study



**Supplemental Table 1.** Baseline characteristics of patients randomized to MBCT versus Treatment as Usual

|  |  |  |  |
| --- | --- | --- | --- |
| **Participant Data** | **Total Sample** **(n=61)****Mean(±SD)****%(n)** | **Intervention****Group****(n=32)****Mean(±SD)****%(n)** | **Control****Group****(n=29)****Mean(±SD)** **%(n)** |
| **Demographic information** |  |  |  |
|  Female | 72.1(44) | 78.1(25) | 65.5% (19) |
|  Age, yr | 67.8±6.2 | 67.9±6.8 | 67.7±5.6 |
|  Ethnicity, Caucasian | 60.7% (37) | 59.4% (19) | 62.1% (18) |
|  Marital Status |  |  |  |
|  *Married* | 27.9% (17) | 28.1% (9) | 27.6% (8) |
|  *Common law* | 4.9% (3) | 0% (0) | 10.3% (3) |
|  *Single* | 50.8% (31) | 50% (16) | 51.7% (15) |
|  *Widow* | 11.5% (7) | 15.6% (5) | 6.9% (2) |
|  *Divorced* | 4.9% (3) | 6.3% (2) | 3.4% (1) |
|  Levels of education |  |  |  |
|  *Elementary school* | 3.3% (2) | 6.3% (2) | 0% (0) |
|  *High school* | 37.7% (23) | 37.5% (12) | 37.9% (11) |
|  *Bachelor* | 33.3% (20) | 15% (9) | 37.9% (11) |
|  *Masters/PhD* | 19.7% (12) | 21.9% (7) | 17.3% (5) |
|  Living arrangement |  |  |  |
|  *With family member* | 34.4% (21) | 31.3% (10) | 37.9% (11) |
|  *Living alone* | 62.3% (38) | 65.6% (21) | 58.6% (17) |
|  *Living in long-term*  *care/seniors'residence/* *retirement home* | 4.9% (3) | 6.3% (2) | 3.4% (1) |
| **Medical History** |  |  |  |
|  Number of medical problems | 2.1±2.0 | 2.1±2.3 | 2.1±1.7 |
|  Number of current medications | 3.8±3.4 | 3.9±3.9 | 3.7±2.9 |
| **Mental health information** |  |  |  |
|  Anxiety diagnosis | 57.4% (35) | 56.3% (18) | 58.6% (17) |
|  Depression diagnosis | 54.1% (33) | 56.3% (18) | 51.7% (15) |
|  Others diagnosis | 11.5% (7) | 6.3% (2) | 10.4% (3) |
|  Number of years diagnosed | 15.3±12.1 | 15.2±13.9 | 15.4±10.5 |
|  Number of years symptomatic | 21.6±18.5 | 20.8±19.5(n=26) | 22.4±17.7 |
|  Number of current psychotropics  | 1.0±0.94 | 1.0±1.0 | 0.9±0.9 |
|  Psychotropic Medications | 55.7% (34) | 59.4% (n9) | 51.7% (15) |
| *Antidepressants (ATD)* | 45.9% (28) | 43.8% (14) | 48.5% (14) |
|  *Hypnotic/sedatives* | 21.3% (13) | 25.0% (8) | 17.2% (5) |
|  *ATD and hypnotic/sedatives* | 16.4% (10) | 21.8% (7) | 10.3% (3) |
|  *Antipsychotics* | 6.6% (4) | 3.1% (1) | 10.3% (3) |
|  *Other* | 1.6% (1) | 3.1% (1) | 0% (n=0) |
|  Current mental health follow-up  | 47.5% (29) | 50.0% (16) | 44.8% (13) |
|  Habits |  |  |  |
|  *Alcohol consumption* | 32.8% (20) | 31.3% (10) | 34.5% (10) |
|  *PHQ-9* | 14.8±5.1 | 14.2±5.3 | 15.41±4.9 |
|  *GAD-7* | 12.0±4.4 | 11.6±3.9 | 12.4±5.0 |
|  *EQ-5D*  | 11.1±10.3 | 9.8±3.3 | 12.5±14.5 |

Data are displayed either as mean±SD or as n (%). TAU, treatment as usual; PHQ-9, Patient Health Questionnaire-9; GAD-7, Generalized Anxiety Disorder-7; EQ-5D, EuroQol Five Dimension Scale (Quality of Live).

**Table 2.** Effects of MBCT vs. TAU across global scores of Depression (PHQ-9), Anxiety (GAD-7) and Quality of life (EQ-5D).

|  |  |  |  |
| --- | --- | --- | --- |
| Measure | MBCT Group (n=27) | TAU Control Group (n=26) |  |
|  | Mean±SDPre-Testn=27 | Mean±SDPost-Testn=27 | ***Mean Change±SD******n=27*** | Mean±SDPre-Testn=26 | Mean±SDPost-Testn=26 | ***Mean Change±SD******n=26*** | Statistics *t, U d* *P* value  |
| Primary and Secondary Outcomes |
| PHQ-9 (Depression) | 14.8±4.9 | 6.9±4.4 | ***-7.9±4.4*** | 15.7±5.1 | 11.7±6.4 | ***-4.0±4.7*** | U=179.5, p=0.002 | d=0.86 |
| GAD7(Anxiety) | 11.4±3.8 | 5.0±4.1 | ***-6.4±5.0*** | 12.6±5.1 | 10.6±5.8 | ***-2.0±3.8*** | t(51)=-3.58, p=0.001 | d=0.99 |
| Exploratory Outcomes |
| EQ-5D(Quality of life) | 10.3±3.2 | 9.7±3.6 | ***-0.6±3.5*** | 9.5±3.2 | 9.9±3.8 | ***0.4±2.0*** | U=241, p=0.048 | d=0.35 |

*PHQ-9* Patient Health Questionnaire; *GAD-7* Generalized Anxiety Disorder Scale-7; *EQ-5D* EuroQol Five Dimension Scale (Quality of Life); *d* standardized effect size.

SD – Standard Deviation, TAU – Treatment as Usual

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