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Meditation for Adults with Mild Cognitive Impairment: A Pilot Randomized Trial

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Author's Contributions

Dr. Wells was involved in all aspects of this study: design/conceptualization of study, acquisition, analysis, and interpretation of data, obtaining funding, and drafting/revising the manuscript. Dr. Kerr was involved in design and conceptualization of the study, analysis and interpretation of data, and revising the manuscript. Dr. Wolkin was involved in design and conceptualization of the study, acquisition, analysis, and interpretation of the data. Dr. Dossett was involved in design of the study, analysis and interpretation of data, and revising the manuscript. Dr. Davis was involved in design and conceptualization of the study and data analysis and interpretation. J. Walsh was involved in acquisition of data and revising the manuscript. Dr. Wall was involved in conceptualization of the study, revising the manuscript, and in conducting the intervention. Dr. Kong was involved in design/conceptualization of the study, analysis and interpretation of the data, obtaining funding, drafting/revising the manuscript, and supervising the study. T. Kaptchuk was involved in design/conceptualization of the study, obtaining funding, study supervision, and revising the manuscript. Dr. Press was involved in design/conceptualization of the study, analysis and interpretation of the data, revising the manuscript, and supervising the study. Dr. Phillips was involved in design/conceptualization of the study, analysis and interpretation of the data, obtaining funding, revising the manuscript, and supervising the study. Dr. Yeh was involved in design and conceptualization of the study, analysis and interpretation of data, revising the manuscript, and she was a study supervisor.

Conflict of Interest

The editor in chief has reviewed the conflict of interest checklist provided by the authors and has determined that the authors have no financial or any other kind of personal conflicts with this paper.

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To the Editor

High levels of chronic stress are associated with an increased incidence of Mild Cognitive Impairment (MCI) and Alzheimer's disease (AD) (1, 2) and negatively impact the hippocampus, a key AD brain region. Mindfulness Based Stress Reduction (MBSR), a standardized mindfulness meditation/yoga intervention, may decrease stress/cortisol, improve well-being, and increase hippocampal gray matter density in healthy adults. (3, 4) Studies also demonstrate that meditation selectively activates the hippocampus,(5) and experienced meditators have larger hippocampal volumes and gray matter compared to controls. (6) Within this context, our objectives were to: 1) test the safety/feasibility of MBSR in adults with MCI; 2) explore the effects of MBSR on cognition and well-being through standardized instruments, neuropsychological evaluations, and interviews.

METHODS

We recruited 14 subjects from 2010-2011 from Beth Israel Deaconess Medical Center's Cognitive Neurology Unit with our human subjects review board's approval. The study was registered with the NIH clinical trials database (Clinicaltrials.gov, NCT01605448). We based entry criteria on the Alzheimer's Disease Neuroimaging Initiative (7) and the MCI research operational definition.(8) Inclusion criteria: adults 55-90 years with MCI determined by a neurologist through history, physical, and neuropsychological testing (including Weschler Memory scale IV, Mini Mental Status Exam, Clinical Dementia Rating). Exclusion criteria: actively practicing meditation/yoga; any history of brain lesions or major head trauma.

Participants were randomized 2:1 to MBSR or usual care using permuted block randomization with randomly varying block size. The MBSR class met for 8 two-hour weekly sessions, plus one “mindfulness retreat day.” Mindfulness, defined as non-judgmental moment to moment awareness, was cultivated through sitting and walking meditation, body scan, and mindful movement (yoga). Home practice (30 min/day) was encouraged with standard guided audio recordings.

To assess safety and feasibility, we systematically collected class attendance, home practice logs, and adverse events. At baseline and 8 weeks, all participants underwent an exploratory battery of neuropsychological measures by a blinded neuropsychologist (Table 1A), including the Alzheimer's Disease Assessment Scale, cognitive subscale (ADAS-cog), and standardized quality of life (QOL) and well-being questionnaires (Table 1B). Semi-structured interviews were also conducted in the MBSR group. We used fMRI to assess measures of brain function/structure and results will be reported elsewhere.

Descriptive statistics were used to analyze adherence and baseline characteristics. The neuropsychological tests and well-being measures were assessed by analyzing the change in scores from baseline to 8 weeks using the Wilcoxon rank sum test to compare the MBSR

and control groups. All analyses were conducted intention-to-treat. SAS v. 9.2 was used for quantitative analyses. The transcribed qualitative patient interviews were coded using an emergent themes inductive approach informed by grounded theory.(9)

RESULTS

The two groups (MBSR and control) did not differ by age (± SD) [73 (± 8) vs. 75 (± 7)] or MMSE score (± SD) [27 (± 2) for both groups]. There were no adverse events reported related to the study protocol, mean class attendance was 7.9 out of 9, and mean (± SD) daily home practice was 26 minutes (± 20). Interviews themes included: improved mindfulness skills, well-being, interpersonal skills, acceptance/awareness of MCI, decreased stress reactivity, group benefit, and overall course enjoyment. There were no significant changes detected for MBSR vs. control in ADAS-cog change from baseline (Table 1A), however individual data reflected trends of improvement for the MBSR group and worsening for the control group. Unexpectedly, control subjects performed better than the MBSR group on the Trails A and B tests, potentially due to order of testing and fatigue effects. Otherwise there were no significant differences between the 2 groups on other measures of cognition (Table 1A). Non-significant trends that suggested improvement with MBSR vs. control were detected for the Resilience Scale, Perceived Stress Scale, QOL-AD, Herth Hope Index, and Life Orientation Test-Revised (Table 1B).

DISCUSSION

In this proof of concept clinical trial, we found that adults with MCI can safely participate and adhere to an MBSR program. The qualitative interviews revealed that most enjoyed the program and described improved mindfulness skills, well-being, inter-personal skills, acceptance/awareness of MCI, and decreased stress reactivity. Most data suggest trend towards improvement for measures of cognition and well-being. Despite the principal limitation of small sample size, this study is a valuable preliminary assessment of a promising approach for patients with MCI as it suggests MBSR is a safe, feasible, well-accepted intervention that may positively impact QOL and well-being. For patients who have few other options for improvement and may live in fear of progression to dementia, psychological well-being and QOL are crucial yet often forgotten factors to address and treat. Further studies with larger sample sizes are needed.

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Table 1

Neuropsychological Results (1A) and Measures of Quality of Life and Well-Being (1B)

1A. Neuropsychological Measure	Median Score at Baseline	Median Score at Follow-up	Median Change From Baseline [Q1, Q3]	*p*-value
ADAS-cog**				0.46
MBSR	11	8.5	-0.5 [-4, 0.5]	
Control	8	12	0 [-1, 2]	
RAVLT-total 1-5*				0.24
MBSR	28	25	-2.5 [-5.5, 0]	
Control	21	25	1 [-1, 4]	
Trails A**				0.04
MBSR	41	45	0 [-3, 4]	
Control	38	30	-10 [-12, -5]	
Trails B**				0.01
MBSR	102	102	3 [-7, 19]	
Control	143	100	-69 [-85, -31]	
COWAT*				0.55
MBSR	31	33	0 [-7, 3]	
Control	35	40	2 [-4, 6]	
Animal Naming*				0.79
MBSR	16	12	0 [-3, 1]	
Control	13	11	0 [-1, 3]	
Boston Naming*				0.23
MBSR	50	51	0 [0, 1]	
Control	49	52	3 [1, 4]	
1B. Measure of Quality of Life/"Well-Being"				
RS*				.18
MBSR	142	144	7 [2, 21]	
Control	156	146	-2 [9, 0]	
PSS**				.46
MBSR	13	10	-1 [-6, 0]	
Control	11	13	0 [-4, 2]	
QOL-AD*				.25
MBSR	42	44	2 [-1, 3]	
Control	41	41	0 [-1, 0]	
HHI*				.42
MBSR	76	77	1 [1, 4]	

1A. Neuropsychological Measure	Median Score at Baseline	Median Score at Follow-up	Median Change From Baseline [Q1, Q3]	*p*-value
Control	71	69	0 [-2, 1]	
LOT-R*				.22
MBSR	16	18	1 [0, 2]	
Control	18	18	0 [0, 0]	
CES-D**				.35
MBSR	6	9	2 [0, 3]	
Control	6	6	0 [-3, 1]	
MAAS*				.74
MBSR	4	4.5	-0.1 [-0.3, 0.5]	
Control	4.4	4.7	-0.3 [-0.3, 0.1]	

[Q1-Q3], 25th and 75th percentile; ADAS-cog, Alzheimer's Disease Assessment Scale, cognitive subscale; MBSR, Mindfulness Based Stress Reduction; RAVLT, Rey Auditory Verbal Learning Test; COWAT, Controlled Oral Word Association Test, RS, Resilience Scale; PSS, Perceived Stress Scale; QOL-AD, Quality of Life-Alzheimer's Disease; HHI, Herth Hope Index; LOT-R, Life Orientation Test-Revised; CES-D, Center of Epidemiology Depression Scale; MAAS, Mindful Attention Awareness Scale.

*Higher=better score

**Lower=better score