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Yoga and compassion meditation program improve quality of life and self-compassion in family caregivers of Alzheimer's disease patients: A randomized controlled trial

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Aim: To investigate the effects of the practice of yoga in combination with compassion meditation on the quality of life, attention, vitality and self-compassion of family caregivers of patients with Alzheimer's disease.

Methods: A total of 46 volunteers were randomly allocated to two groups, the yoga and compassion meditation program group ($n = 25$), and the control group (CG) that received no treatment ($n = 21$). The program lasted 8 weeks, and comprised three yoga and meditation practices per week, with each session lasting 1 h and 15 min. Quality of life, attention, vitality, and self-compassion scores were measured pre- and postintervention.

Results: The yoga and compassion meditation program group showed statistically significant improvements ($P < 0.05$) on quality of life, attention, vitality and self-compassion scores as compared with the control group, which showed no statistical significant differences at the postintervention time-point.

Conclusions: The findings of the present study suggest that an 8-week yoga and compassion meditation program can improve the quality of life, vitality, attention, and self-compassion of family caregivers of Alzheimer's disease patients. *Geriatr Gerontol Int 2015; ••: ••–••.*

Keywords: attention, caregiver, meditation, quality of life, self-compassion, vitality, yoga.

Introduction

A high incidence of chronic degenerative diseases, such as dementia, has been associated with the aging of the world population, and Alzheimer's disease is one of the most common dementias.¹ Alzheimer's disease is a progressive brain disorder that involves the loss of reasoning, memory, language and the ability to live independently. Thus, patients who suffer from this disease often require care from another person, and must adapt to ensure their health, functional capacity and safety.² Most caregivers are female and immediate relatives.³ These individuals have a poor quality of life as a result of

the physical and psychological burden of caregiving.⁴ Such physical, psychological, social and financial burden can increase the risk of death.⁵ Within this scenario, techniques such as yoga and meditation have emerged as low-cost interventions that offer little or no risk to the practitioners. Yoga seeks to develop attention through physical postures, breathing exercises and formal meditative practices. Although meditation is an aspect of the yoga system, several meditative practices, such as compassion meditation from the Buddhist tradition, are not directly associated with yoga. Thus, throughout the present article, we use the terms yoga and meditation separately, yoga when referring practices of physical postures and breathing exercises, and the term meditation when referring to sitting or formal meditation.

To date, no published studies have investigated the effects of such practices on the quality of life, attention, vitality and self-compassion of family caregivers. A study of 12 female caregivers of relatives with dementia included the practices of meditation, body postures and breathing techniques from yoga as treatment. At the end

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of the study, improvements in the depression and anxiety states of these caregivers were detected.⁶ Similar results were reported by Jain *et al.*, who found that meditation improved the profile of depression, anxiety and insomnia symptoms of caregivers of patients with dementia.⁷ However, such results should be interpreted with caution, because some of those studies included a small number of participants and lacked a control group.^{6,7} Therefore, our objective was to investigate the effects of the practice of yoga and compassion meditation on the quality of life, attention, vitality, and self-compassion of family caregivers of patients with Alzheimer's disease.

Methods

The current study was approved by the Research Ethics Committee of the UNIFESP, protocol number 1528/07. The Clinical Trials Registration number is NCT02563483.

Volunteers

Volunteers were recruited through radio and newspaper advertisements, and from the Alzheimer's Association of Brazil (Associação Brasileira de Alzheimer – ABRAZ). The recruitment period was from January to October 2009. The study inclusion criteria were as follows: age over 18 years, completed at least primary education level and at least at the phase of stress resistance according to Lipp's Inventory of Stress Symptoms for adults.⁸ The study exclusion criteria were as follows: patients with asthma or chronic obstructive pulmonary disease; alcohol use (more than 5 drinks per week) or use of drugs-of-abuse; suffering from Cushing's syndrome; under treatment with topical, nasal or any form of steroids within the last 30 days; and practicing yoga, meditation or similar techniques. The use of tranquilizers was allowed if the volunteer had begun the medication use before the experiment and continued to use it during the experiment, in the same dosage. A total of 53 family caregivers were selected, of whom 46 completed all phases of the study. The volunteers were randomized into the following two groups: 25 family caregivers (22 women and 3 men) composed the yoga and compassion meditation program (YCMP) group, and 21 family caregivers (19 women and 2 men) composed the control group (CG). The randomization was: two pieces of folded paper (written: control group OR intervention group) were placed into a box. The volunteer chose one of them randomly. The sample size was calculated using statistical analysis. Previous research carried out with similar techniques to our protocol show that to obtain a power of 0.80, with alpha fixed at 0.05, a total of 50 participants would be necessary.⁹ At the end of this

research, we finished with 46 volunteers, and most of the variables investigated had power equal to or greater than 0.80.

Outcome measures

The participants underwent a clinical examination and signed an informed consent form. Then, they completed identification questionnaires and the following inventories: the World Health Organization Quality of Life questionnaire (WHOQOL-BREF),¹⁰ Subjective Vitality Scales,¹¹ Mindfulness Attention Awareness Scale¹² and Self-Compassion Scale.¹³ After 8 weeks, these assessments were repeated in both groups. The assessors were blinded.

Intervention

The control group (CG) was a non-treatment group. For ethical reasons, after the end of the study, the volunteers in the CG also participated in the suggested intervention. The participants visited the Psychobiology Department of UNIFESP, where they were subjected to a clinical examination to assess their overall health, filled in identification questionnaires, and signed a free and informed consent form. Next, the volunteers filled in the psychological scales and inventories. These same assessments were carried out 2 months later in both groups.

The duration of the yoga and compassion meditation program group (Y CMP) was 8 weeks. The program included sessions three times per week, with each session lasting 1 h and 15 min. The yoga practices were low intensity. One of the weekly sessions was carried out in person, and the other two sessions were practiced at home with the help of a DVD. Volunteers said they practiced at home through a questionnaire. This control was weekly before the practice. The following sequence was carried out by the Y CMP group: poses – *asana* (25 min, holding each pose for an average of 1 min and 30 s): *Sukhasana*, *Vajrasana*, *Yoga-Mudra*, *Paschimotanasana*, *Ardha-Matsyendrasana*, *Shavasana*, *Naukasana*, *Bhujangasana*, *Ardha-Shalabhasana*, *Chakrasana*, *Vrikshasana* and *Sarvagasana*; breathing exercises – *pranayama* (25 min, maintaining each pranayama for an average of 3 min); *Adhama Pranama*, *Bastrika*, *Ujjayi*, *Suryabhedana*, *Chandrabhedana*, *Nadisodhana* and *Kapallabhat*; meditative practices – mindfulness meditation (approximately 12 min and 30 s), where attention is maintained on the sensations, perceptions and thoughts without judging, and meditation with an emphasis on voluntary production of compassionate feelings for all living beings (12 min and 30 s).

Statistical analysis

To test whether the groups were similar in the pre-intervention condition, the χ^2 -est was applied to

nominal and ordinal qualitative variables, and Student's *t*-test was applied to quantitative variables. A two-way ANOVA (YCMP and CG, pre- and postintervention) was applied to the WHOQOL-BREF, Subjective Vitality Scales, Mindfulness Attention Awareness Scale and Self-Compassion Scale, followed by Tukey's test when necessary. The statistical significance of differences between groups, at pre- and postintervention, and interactions between these factors were assessed. All statistical analyses were carried out using the Statistica software version 10.1 (Statistica 10.1, Statsoft, Tulsa, Oklahoma, USA). Statistical significance was set at $\alpha \leq 0.05$.

Table 1 Pre-intervention demographic characteristics of the studied sample

	Control group (n = 21)	Y CMP (n = 25)	P-value
Sex [†]			NS
Male	2 (10)	3 (12)	
Female	19 (90)	22 (88)	
Age (years) [‡]	53.4 ± 8.2	55.5 ± 8.1	NS
Time as caregiver	5.7 ± 3.7	4.2 ± 3.3	NS

[†]Data expressed as frequency (percent). [‡]Data expressed as the mean ± SD. NS, non-significant difference, χ^2 -test or Student's *t*-test; YMCP, yoga and compassion meditation program group.

Results

The seven volunteers who withdrew claimed that they had no time to participate in the study because of their duties as caregivers. The individuals did not have uncontrolled chronic health problems. The use of medication was according to the inclusion criteria.

In the pre-intervention period, the two groups were statistically homogeneous, as shown in Table 1.

Table 2 shows the data for the WHOQOL-BREF domains – physical, psychological, social relationships, environment, and overall quality of life and health. The YCMP group showed significant postintervention increases in all domains compared with the pre-intervention scores. This effect was not observed in the CG. Furthermore, except for the physical and social relationships domains, the YCMP group showed statistically higher postintervention scores compared with the CG.

Table 3 shows the data for attention and vitality. These measures were obtained using the Mindfulness Attention Awareness Scale and Subjective Vitality Scales, respectively. On these scales, the YCMP group showed significant postintervention increases compared with the pre-intervention scores. This effect was not observed in the CG. However, there was no significant difference between the groups.

Table 4 shows the values for the Self-Compassion Scale. The self-acceptance subscales and the total score showed a significant interaction when comparing pre-intervention X postintervention YCMP. This result

Table 2 Pre- and postintervention quality of life (as measured by the World Health Organization Quality of Life questionnaire) of familial caregivers of Alzheimer's disease patients

Domains	Pre	Post	F _{time-point(1,44)}	F _{group(1,44)}	F _{inter(1,44)}
Physical					
Y CMP (n = 25)	13.5 ± 3.0	15.2 ± 2.4*	<i>P</i> < 0.001	<i>P</i> = 0.27	<i>P</i> < 0.01
Control group (n = 21)	13.4 ± 2.9	13.5 ± 3.0	16.5	1.3	12.0
Psychological					
Y CMP (n = 25)	12.7 ± 2.4	14.7 ± 2.1* ***	<i>P</i> < 0.01	<i>P</i> = 0.22	<i>P</i> < 0.00001
Control group (n = 21)	13.1 ± 2.6	12.6 ± 2.4	11.7	1.5	32.6
Social relationships					
Y CMP (n = 25)	13.0 ± 3.0	14.4 ± 3.3*	<i>P</i> = 0.14	<i>P</i> = 0.09	<i>P</i> < 0.01
Control group (n = 21)	12.3 ± 3.0	11.9 ± 3.7	2.3	3.1	9.2
Environment					
Y CMP (n = 25)	13.9 ± 2.1	14.7 ± 2.0* ***	<i>P</i> < 0.05	<i>P</i> < 0.05	<i>P</i> < 0.05
Control group (n = 21)	13.1 ± 1.5	13.1 ± 1.7	4.6	5.2	9.2
Overall quality of life					
Y CMP (n = 25)	12.8 ± 3.2	14.8 ± 2.4* ***	<i>P</i> < 0.01	<i>P</i> = 0.08	<i>P</i> < 0.01
Control group (n = 21)	12.5 ± 3.2	12.4 ± 2.5	7.7	3.2	9.3

Data expressed as the mean ± SD. **P* < 0.05 differs from the pre-intervention time-point in the corresponding group – Tukey's test. ***P* < 0.05 differs from the control group in the post-intervention time-point – Tukey's test. Y CMP, yoga and compassion meditation program group.

Table 3 Pre- and post-intervention mindfulness attention (Mindfulness Attention Awareness Scale) and vitality (Subjective Vitality Scales) of familial caregivers of Alzheimer's disease patients

	Pre	Post	F _{time-point(1,44)}	F _{group(1,44)}	F _{inter(1,44)}
Mindfulness Attention and Awareness Scale					
YCMP (n = 25)	3.7 ± 0.1.0	4.3 ± 0.8**	P < 0.001	P = 0.53	P < 0.00001
Control group (n = 21)	3.9 ± 0.8	3.8 ± 0.7	13.8	0.4	28.1
Subjective Vitality Scale for life in general					
YCMP (n = 25)	3.9 ± 1.1	4.5 ± 1.1*	P < 0.01	P = 0.24	P < 0.01
Control group (n = 21)	3.8 ± 1.4	3.7 ± 1.4	8.6	1.4	9.9
Subjective Vitality Scale for the present moment					
YCMP (n = 25)	4.3 ± 1.3	5.1 ± 1.2*	P = 0.06	P = 0.27	P < 0.001
Control group (n = 21)	4.2 ± 1.4	3.7 ± 1.5	4.3	1.2	15.5

Data expressed as the mean ± SD. **P < 0.001 differs from the pre-intervention time-point in the corresponding group – Tukey's test; *P < 0.01 differs from the pre-intervention time-point in the corresponding group – Tukey's test. YCMP, yoga and compassion meditation program group.

Table 4 Pre- and postintervention Self-Compassion Scale values of familial caregivers of Alzheimer's disease patients

	Pre	Post	F _{time-point(1,44)}	F _{group(1,44)}	F _{inter(1,44)}
Self-kindness					
YCMP (n = 25)	3.2 ± 1.0	3.5 ± 0.8*	P < 0.05	P = 0.99	P < 0.05
Control group (n = 21)	3.4 ± 1.0	3.4 ± 0.9	7.2	<0.001	4.7
Self-judgment					
YCMP (n = 25)	2.6 ± 0.9	3.1 ± 0.8	P < 0.001	P = 0.20	P < 0.08
Control group (n = 21)	3.1 ± 0.9	3.3 ± 0.9	14.8	1.7	3.1
Common humanity					
YCMP (n = 25)	3.4 ± 0.9	3.7 ± 0.7	P = 0.10	P = 0.40	P = 0.19
Control group (n = 21)	3.3 ± 0.8	3.4 ± 0.9	2.8	0.7	1.8
Isolation					
YCMP (n = 25)	2.7 ± 1.0	2.4 ± 0.9	P = 0.07	P = 0.78	P = 0.43
Control group (n = 21)	2.7 ± 1.1	2.6 ± 1.3	3.5	0.1	0.7
Mindfulness					
YCMP (n = 25)	3.2 ± 0.8	3.6 ± 0.8	P < 0.01	P = 0.62	P = 0.10
Control group (n = 21)	3.2 ± 0.9	3.3 ± 0.8	7.9	0.3	2.8
Over identification					
YCMP (n = 25)	2.8 ± 0.9	3.0 ± 0.6	P < 0.01	P = 0.31	P = 0.78
Control group (n = 21)	3.0 ± 1.1	3.3 ± 1.1	0.8	1.1	0.1
Total score					
YCMP (n = 25)	3.0 ± 0.5	3.2 ± 0.4*	P < 0.001	P = 0.65	P < 0.05
Control group (n = 21)	3.1 ± 0.5	3.2 ± 0.4	17.9	0.2	5.0

Data expressed as the mean ± SD. *P < 0.05 differs from the pre-intervention time-point in the corresponding group – Tukey's test. YCMP, yoga and compassion meditation program group.

shows that the increase in the intervention group was significant and greater than that observed in the CG.

There were no unintended effects in each group.

Discussion

The present study investigated whether the practice of yoga and compassion meditation improves the quality

of life, attention, vitality and self-compassion of family caregivers of Alzheimer's disease patients. As in other studies evaluating quality of life in caregivers, we observed that caregivers benefited from YCMP regarding quality of life.¹⁴ Anjos *et al.* reported that workload imposed by caregiver's work is great, and the higher workload, the lower quality of life.¹⁵ According to this same study, low back pain was one of the most common

health-related problems reported by caregivers. This is partly because of work overload, which can negatively impact on quality of life, with a negative correlation between pain and quality of life.^{16,17} In the present study, we did not evaluate pain. However, it is an important aspect of quality of life, and being common among caregivers, we must consider not only the treatment, but also the prevention. Given this, yoga is efficient to relieve low back pain, as seen in a systematic review.¹⁸ Therefore, the results of the present study are in accordance with the literature, and extend the findings to the context of family caregivers of Alzheimer's disease patients.

Vitality, also evaluated in the present study, is important for both health and quality of life. A study showed that yoga practitioners experienced better quality of life, as assessed by the 36-Item Short Form Health Survey, compared with the general population. The 36-Item Short Form Health Survey is an instrument used to assess health and quality of life, and vitality is one of its domains. The authors found a significant difference in levels of vitality on the 36-Item Short Form Health Survey when comparing practitioners of yoga with non-practitioners.¹⁹ In the context that surrounds patients with Alzheimer's disease, caregivers have less vitality than non-caregivers.²⁰ As the workload imposed on caregiver is high,¹⁵ vitality becomes an important quality to be developed in caregivers. In a study in which women practiced Yoga Nidra (a relaxation yoga technique), the authors reported an increase in vitality, well-being and overall health among volunteers in the Yoga Nidra group.²¹ These effects were also observed by Moliver *et al.*, who reported an increase in the psychological well-being and vitality in female yoga practitioners.²² The present study is consistent with previous work, as most of our sample were women. The results of the present study also support the claim that meditation and yoga practice can increase family caregivers' levels of vitality for carrying out their daily chores and caring for a sick family member, which requires substantial physical and mental energy.

The results show a significant interaction for attention in the YCMP group. Nyklicek and Kuijpers examined a healthy group of meditation practitioners and reported improved attention.⁹ According to Pagnoni and Cekic, Zen meditation affects the amount of gray matter in several brain areas, such as the putamen, an area strongly associated with the processing of attention, and that both gray matter volume and attention performance were negatively correlated with age.²³ Kozasa *et al.* showed greater brain efficiency in a group of meditators, who recruited fewer brain areas than did non-meditators in an attention and impulse control test.²⁴ Our sample was made up of volunteers with a mean age of 54 years. Alzheimer's disease is a slowly

developing disease, therefore the caregivers will become older over the years of care. Meditation has positive effects for age-related cognitive loss, and might improve cognitive abilities, including attention, of older adults.²⁵ In a systematic review on the topic, Chiesa claimed that the practice of meditation is associated with neurobiological changes in brain areas related to maintaining attention, such as the prefrontal and anterior cingulate cortex.²⁶ Thus, it is possible to assume that the practice of meditation can exert a neuroprotective effect, reducing cognitive decline associated with normal aging and deleterious effects of stress, which is in the context of Alzheimer's disease patients' caregivers. In yoga and meditation practices, being aware of physical sensations, such as breathing, for example, is essential. This attentional process on body sensations, or interoception, is mediated by the insula, and is an important factor in generating emotions, empathy and the affective state of others.²⁷

The Self-Compassion Scale improvements that the YCMP group achieved show that the protocol used in the current study possibly can help generate a more compassionate emotional state. Difficulties found in caregiving can lead to family members rejecting the caregiver role.¹⁵ Hence, so the caregiver does not feel resigned when they are obliged to become caregivers, they must develop compassion and self-compassion. According to Davidson,²⁸ emotional states based on compassionate and resilient behaviors have marked biological features, such as greater activation of the left prefrontal cortex, more effective modulation of amygdala activation, and rapid recovery after stressful and negative emotional experiences, with stress and negative emotional experiences being quite common to caregivers.⁴ The researcher also claimed that these behavioral patterns are strongly correlated with lower baseline cortisol levels and high concentrations of antibodies to certain viruses. Supporting this hypothesis, Neff investigated Buddhist practitioners of meditation, and found they had higher scores compared with subjects with no experience in contemplative practices, showing that emotional learning might arise from this practice.¹³ Lutz *et al.* detected that the blood flow to brain areas associated with emotional representations was greater in one expert group of compassion meditation, showing that this effect can be modulated by the practice of this particular meditation technique.²⁹ Shapiro *et al.* showed higher scores of self-compassion in a group that practiced meditation.³⁰ Additionally, women were less self-compassionate than men, suggesting a greater tendency for women to feel isolated and make negative judgments of themselves.¹³ In the present study, the sample of family caregivers consisted almost entirely of women, which shows that the practice of yoga and compassion meditation might be useful for counteracting this gender bias.

With the aging population, there will be an increase in degenerative diseases, such as Alzheimer's disease, and in same proportion the number of caregivers.¹ Thus, practices that meet both the demands of patients and their caregivers are important, patients and their caregivers are important because of the close relationship between them. The well-being of the caregiver leads to a better care of the patient.

The current study shows that the practice of recommended yoga and meditation techniques might increase the quality of life, attention, self-compassion and vitality of family caregivers of patients with Alzheimer's disease.

One limitation of the present study was the duration of YCMP. It is possible that some of the variables measured in the current study cannot be appreciably altered in the proposed time period. Perhaps a slightly longer period of practice could differentiate the groups at the postintervention time-point. Another limitation was home practices. On the one hand, it is easier for the caregivers, as displacement in a big city like São Paulo is difficult. On the other hand, the researcher has less control of the frequency and how these practices are being carried out. For future studies, we recognize the necessity of a group that receives active intervention and is not simply on a wait list.

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Disclosure statement

The authors declare no conflict of interest.

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