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Original Article

Effects of a psychoeducational intervention focusing on cognitive training in caregivers of older adults with Alzheimer's disease[1]

Efeitos de uma intervenção psicoeducativa com enfoque em treino cognitivo em cuidadores de idosos com doença de Alzheimer

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Abstract

Introduction: Cognitive interventions can be important support strategies for caregivers of older adults with Alzheimer's disease (AD) since they improve their physical and mental health. **Objective:** To evaluate and analyze the effects of psychoeducational intervention with a focus on cognitive stimulation on cognition, anxiety, stress, and overload in caregivers of elderly people with Alzheimer's disease. **Method:** This is a randomized, controlled, blinded clinical trial, performed with 37 informal caregivers divided into Home Intervention Group (HIG) and Control Group (CG). Participants were assessed before and after the intervention using Addenbrooke's Cognitive Examination-Revised, Perceived Stress Scale, Depression Inventory and Beck Anxiety, and Zarit Overload Scale. **Results:** There was improvement in the HIG, significant for symptoms of stress (p= 0.0027), cognition (p= 0.003; p= 0.008), attention/orientation (p= 0.004), memory (p= 0.017), and verbal fluency (p= 0.023). Regarding the CG, despite the improvement in the parameters, this was not significant. **Conclusion:** Intervention in caregivers at home is an important tool for improving cognition and stress in caregivers of older adults with AD, but it does not seem to be as effective for symptoms of overload, which highlights the need for specific strategies in this domain.

Keywords: Caregivers, Alzheimer Disease, Aged, Cognition, Occupational Therapy.

[1] This study is the result of a randomized, controlled and blind clinical trial (UTN: U1111-1206-5773), whose steps followed Resolutions 466/12 and 510/16 of the National Health Council. The participation of volunteers was subject to agreement with the Informed Consent Form. The project was approved by the Ethics Committee for Research in Human Beings (Opinion number 2.069.671/2017), CAEE 65119517.1.0000.5504.

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Resumo

Introdução: As intervenções cognitivas podem ser importantes estratégias de apoio aos cuidadores de idosos com doença de Alzheimer (DA), uma vez que melhoram sua saúde física e mental. **Objetivo:** Avaliar e analisar os efeitos de intervenção psicoeducativas com enfoque em treino cognitivo sobre a cognição, ansiedade, estresse e sobrecarga em cuidadores de idosos com doença de Alzheimer. **Método:** Trata-se de um ensaio clínico randomizado, controlado e cego realizado com 37 cuidadores informais divididos em Grupo Intervenção Domiciliar (GID) e Grupo Controle (GC). Os participantes foram avaliados antes e após a intervenção por meio do Addenbrooke's Cognitive Examination-Revised, Escala de Estresse Percebido, Inventário de Depressão e Ansiedade de Beck e Escala de Sobrecarga de Zarit. **Resultados:** Houve melhora significante no GID para sintomas de estresse (p= 0,0027), cognição (p= 0,003; p= 0,008), atenção/orientação (p= 0,004), memória (p= 0,017) e fluência verbal (p= 0,023). Quanto ao GC, apesar da melhora nos parâmetros, essa não foi significativa. **Conclusão:** A intervenção em cuidadores de forma domiciliar é uma importante ferramenta para a melhora na cognição e estresse em cuidadores de idosos com DA, mas não parece ter a mesma eficácia para sintomas de sobrecarga, o que evidencia a necessidade de estratégias específicas para este domínio.

Palavras-chave: Cuidadores, Doença de Alzheimer, Idoso, Cognição, Terapia Ocupacional.

Introduction

Alzheimer's disease (AD) is a chronic progressive neurodegenerative disease, usually associated with age, of insidious onset, which impairs brain structure and function (Seima et al., 2014). As a consequence, AD decreases cognitive performance and affects recent memory, language, visual-spatial recognition, executive function, in addition to compromising the functionality of individuals, causing greater dependence on care (partial or total), in which the role of the caregiver is essential (Seima et al., 2014; Soares et al., 2017).

A caregiver is a person who provides care to those who cannot perform basic activities of daily living, such as bathing, dressing, and eating, as well as instrumental activities of daily living, such as administering medication, paying bills, and carrying out household chores, sleep, rest, leisure activities and social participation (Fagundes et al., 2017). According to the World Health Organization (2017), the role of the informal caregiver is represented, in most cases, by a family member (spouse, daughter, daughter-in-law, or brother), who does not receive any remuneration for the activity. As the degree of dependence of the elderly increases, the quality of life of these individuals is affected, favoring the appearance of psychological disorders, such as stress, anxiety, and depression, caused by the overload of care (Martins et al., 2019).

The overload may be related to social, professional, and personal changes that caregivers face from the moment they assume the responsibility of caring for an elderly person living with dementia, the lack of information about the disease, and the excessive care that can lead to the caregiver to physical and mental illness (Lopes et al., 2020).

In addition to overload, stress can also negatively interfere with the care provided. It is the most frequent psychiatric morbidity among caregivers of older adults and is closely

related to depressive symptoms, social isolation, and anxiety disorder (Fernandes & Garcia, 2009). Thus, the obligation to care causes this psychiatric symptom, caused by the uninterrupted state of wakefulness, attention, and concern for the elderly person (Oliveira & Marques, 2019). Anxiety is heightened in caregivers throughout the care process due to feelings of fear, insecurity, and the ability to recognize the overload and need for self-care by these caregivers (Nobre et al., 2015; Cesário et al., 2017).

In addition to the overload caused by excessive care, memory complaints have been observed, which indicates another field to be investigated and appointed as a priority for the planning of home interventions since stress and overload are factors that can increase the self-report of memory failures (Silva et al., 2012; Leung et al., 2017; Caparrol et al., 2018).

Given these circumstances, psychoeducational interventions emerge as a strategy to reduce the physical and emotional overload of caregivers (Campos et al., 2019). It is a set of activities that aim to strengthen intra and interpersonal skills so that caregivers can adapt to the demands and deal with the stress of care, using a structured format and often taught in small groups, including time for didactic and practice (Falcão et al., 2018). Also, cognitive interventions can be important support strategies for caregivers and can be developed at home and guided by a trained health professional (Campos et al., 2019). Interventions with a focus on cognitive training consist of performing various exercises that together aim to improve or compensate for deficits in a given cognitive function such as memorizing words (for memory stimulation), looking for differences between images (for attention stimulation), to assemble puzzles (to stimulate the constructive capacity), among others (Irigaray et al., 2012).

According to Fialho et al. (2012), cognitive interventions improve mental and physical health. In addition, they reduce the caregiver's overload and depressive symptoms. However, there is a relative paucity of studies on non-pharmacological interventions with caregivers of elderly people with AD. Considering the relevance of the central theme of this study, which meets the agenda of research priorities of the Ministry of Health, with "Health of the elderly person" and sub-axis "Analysis of associated risk and protection factors to dementia in elderly people in Brazil" as one of the priority thematic axes, this study aimed to evaluate the effects of psychoeducational intervention with a focus on cognitive training on cognition, anxiety, stress, and overload in informal caregivers of older adults with AD.

In general, interventions for caregivers of elderly people with dementia in the area of occupational therapy aim to work on compensation strategies for the care recipient's cognitive decline, neglecting their health, which can benefit even from the relief of overload, guidelines for performing activities of daily living and managing the elderly's behavioral changes (Alcantara et al., 2019). Although there is evidence to support the practice of occupational therapy in the care of people with dementia, the objective of interventions must also consider the support to caregivers to analyze the different cognitive and psychological factors related to the care process.

Method

This is a randomized, controlled, and blind clinical trial (UTN: U1111-1206-5773). The sample consisted of caregivers from the Home Assistance Service (HAS), of a private health care provider in the city of São Carlos-SP.

The inclusion criteria were informal caregivers of older adults with a clinical diagnosis of Alzheimer's Disease diagnosed by a neurologist and/or geriatrician who are affiliated with the health care provider, and who has been caring for the elderly patient for more than a year. The exclusion criteria were all paid caregivers or people who had been providing care for less than a year and those who had any physical or mental disorder, or untreated systemic diseases, which made it impossible to apply the assessment performed.

We listed a total of 64 caregivers of elderly people with AD, at the beginning of the second half of 2018, coming from the HAS to participate in this research. A phone call was made to each caregiver, explaining the research objectives and inviting them to participate. Caregivers who agreed to participate (N=46) were evaluated by applying a sociodemographic profile questionnaire (gender, age, education, marital status, category of caregiver, length of care, among others) by a first trained researcher of the group. After being evaluated, two participants were excluded for being caregivers for less than a year and two for taking care of elderly people without the diagnosis of AD given by a doctor. Thus, 42 participants met the inclusion criteria and were randomized to a list generated by the "randomization.com" website, which follows a numerical order in which each member was randomly assigned to one of the groups. Thus, 21 caregivers were allocated to each group, intervention, and control. Throughout the research, there were dropouts in the Home Intervention Group (HIG) for health reasons and the elderly/family's death. Thus, the final number of participants in the Home Intervention Group were n=17, and in the Control Group was n=21. Figure 1 contains the flowchart of the participants who participated in this study, both in the intervention and in the control group.

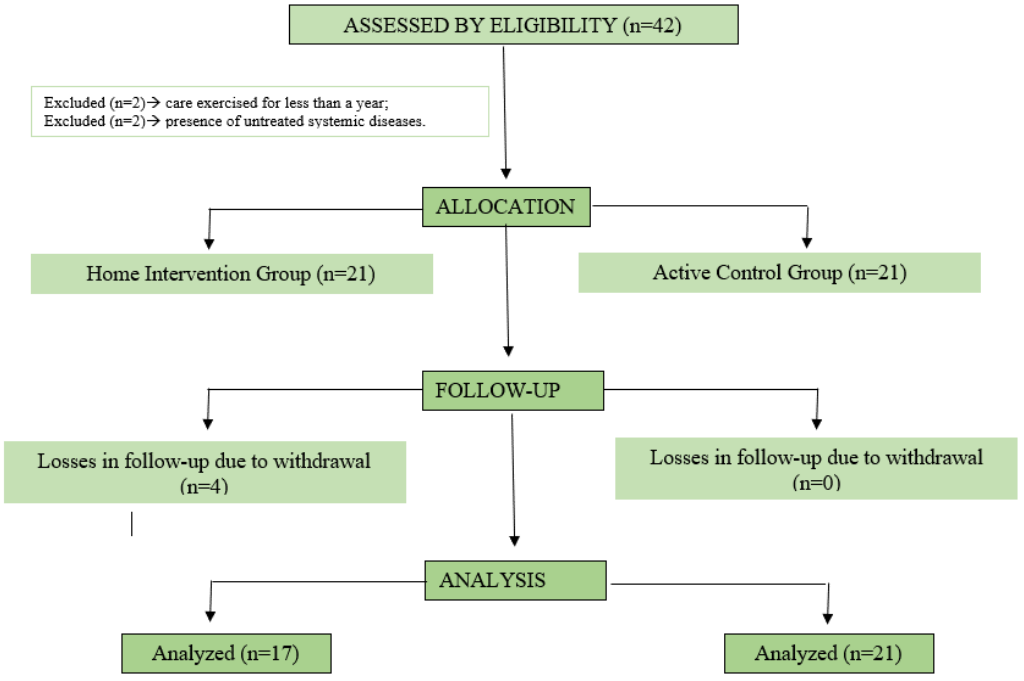

Figure 1. Flowchart on eligibility criteria, allocation, and analysis of intervened participants. São Carlos, 2018. Source: research data.

Home Intervention Group

The HIG received the psychoeducational intervention material with a cognitive focus, containing all the activities that would be developed over 12 weeks by the main researcher. Along with the activities, they received a schedule with the dates and activities. The caregiver was asked to set aside approximately 45 minutes to dedicate exclusively to the activities, once a week.

The research group developed a protocol to stimulate the caregivers' cognition in general, especially in the domains of attention, executive functioning, language, learning, and memory. Thus, the activities were planned in a playful, quick, and dynamic way, in an individual booklet format, in which each activity was explained step-by-step, in a clear, objective, and simple language to facilitate understanding. Three professionals from the areas of gerontology, psychology, and occupational therapy assessed the feasibility of the booklet. Thus, 25 activities were organized and are described below in Table 1.

Table 1. Schedule of home cognitive activities. São Carlos, 2018.

SCHEDULE OF COGNITIVE STIMULATION ACTIVITIES	
Activities	**Week**
Circle the vowels with "Blue pen"	1
Cross out the letters "R" and "S"	
Reproduce recipes	
Find elements of the figures	
SUDOKU	2
Memorize words	
Elaboration of a story from the figure	
TETRA	
Face to face	3
Text interpretation	
Figure Categorization	
SUM 15	
TETRA	4
Sum of the Yellow Triangle	
Reproduce Recipe	
Colored toothpicks	
Training with change	5
7 Mistakes Game	
Memorization of figure elements	
Form words (to elaborate from the letters on the given sheet)	
WRITE FROM BACKWARDS	6
Associative memory game	
Sum of the Orange Triangle	
Mind Academy Game – Face to Face	7
Cross out the letters "R" and "S"	
Form words (to elaborate from the letters on the given sheet)	

Table 1. Continued...

SCHEDULE OF COGNITIVE STIMULATION ACTIVITIES	
Activities	**Week**
Reading and Interpreting	8
Figure Categorization	
SUM 15	
Connect the dots	9
Find the design	
Story elaboration	
Mind Academy Game – What's Different?	10
SUM 15	
SUDOKU	11
TETRA	
Sum of Triangle	12
Tower of Hanoi	
Training with change - supermarket list	

Source: research data.

The activities of this protocol were based on the work of Casemiro et al. (2016) and adapted by members of the research group with the support of experts in the areas of gerontology, psychology, and occupational therapy. The main researcher called the participants weekly, who filled out a small form prepared by the group with information about the participants' doubts, whether they approved the games, whether they were able to perform the activities and whether the 45-minute time was respected.

Control Group

The Control Group (CG) received the material with information about important care for older adults with AD. It is a booklet synthesized from information on the website of the Brazilian Alzheimer's Association (http://abraz.org.br/web, retrieved on October 27, 2020), respecting its guidelines, and addressed themes such as forms of care, treatment of the disease, care for the patient with AD, the caregiver's health, care administration, quality of life of the family caregiver's health, among other topics.

It is important to highlight that, during the development of the research, the CG was also accompanied by the main researcher, through weekly phone calls. A small form prepared by the group was filled out, which contained information about the participants' questions. Upon completion of the survey, participants in the control group received the same intervention as the home intervention group.

Assessment protocol

The pre- and post-intervention assessment protocol consisted of the following instruments:

Cognitive Assessment: Addenbrooke's Cognitive Examination-Revised (ACE-R), which aims to assess six cognitive domains separately: orientation, attention, memory, verbal fluency, language, and visual-spatial ability. The maximum score is 100 points and the sum of all equals the individual's total score on the ACE-R. Among this total,

the 30 points related to the Mini-Mental State Examination (MMSE) are included. The cutoff scores for the battery (ACE-R) and the MMSE were defined with their normative data, being: <78 points for the ACE-R and <25 for the MMSE, considering the age and education of the participants (Carvalho et al., 2010).

Stress: The Beck Perceived Stress Scale (PSS) is a general scale that can be used in different age groups; it has 14 points and aims to assess how unpredictable, uncontrollable, and overloaded the respondents consider their lives and perceive situations as stressful. The scale presents questions with answer options that vary in ascending order: 0 (never), 1 (hardly never), 2 (sometimes), 3 (often), and 4 (always), answered according to the self-assessment of the caregiver made in the last week. The final score can vary between 0 and 56, in which the higher the score, the greater the level of stress perceived by the individual (Luft et al., 2007).

Depressive and anxiety symptoms: The Beck Depression Inventory (BDI) was the chosen instrument, as it corresponds to the symptomatic depression scale that has 21 items, with four alternatives, each ranging from zero to three points. The validated cutoff score is 0 to 9 indicating minimal symptoms or no symptoms, 10 to 18 showing mild symptoms, 19 to 29 with moderate symptoms, and 30 to 63 points for severe depression symptoms (Cunha, 2001). For the screening of anxiety symptoms, the Beck Anxiety Inventory (BAI) was applied, which consists of a list of 21 common anxiety symptoms, with 4 alternatives each, in ascending order of the anxiety level. The validated cutoff score corresponds to 0-10 points, indicating minimal symptoms or absence of anxiety; 11-19, indicating mild symptoms of anxiety; 20-30, moderate symptoms; and 31-63, indicating severe symptoms (Beck et al., 1988; Cunha, 2001).

Overload: the Zarit Overload Scale was validated and adapted for Brazil by Scazufca (2002) evaluating the impact of activities related to the care provided on the physical, emotional, financial conditions, and social relationships of caregivers. Its score ranges from 0 (never) to 4 (always), describing in a self-evaluative way how much the overload affects the individual. The scale total is obtained by the sum of the statements and can range from 0 to 88 points, and the higher the score, the greater the overload. The result indicates the absence of overload (<21 points), mild to moderate overload (21 to 40 points), moderate to severe overload (41 to 60 points), and intense overload (61 to 88 points) (Scazufca, 2002).

Data analysis

Data analysis was performed using the Statistical Package for Social Science (SPSS), version 20.0, by an alternative researcher belonging to the research group, with the help of a statistician, in a descriptive and univariate manner, both for categorical variables (tables of frequency) and for quantitative variables (measures of central tendency and variability). The measured variables were considered normally distributed (Kolmogorov-Smirnov test). The means of the cognition variables (ACE-R and MMSE), the ACE-R domains, depressive symptoms, anxiety, perceived stress, and overload were compared and analyzed for the Home Intervention Group and Control Group, before and after the intervention, through Student's t-test for independent samples. The variables gender, marital status, and whether they live with the elderly patient were compared and analyzed using Fisher's exact test. Values of $p<0.05$ were considered statistically significant.

Ethical aspects

All steps of this work followed the guidelines of Resolution 466/12 and 510/16 of the National Health Council, which aims to ensure rights and duties that concern research participants, the scientific community, and the State, as a guarantee of maintenance of the confidentiality and privacy of the participants during all phases of the research, as well as attention to the risks for the participants, for which precaution and protection measures must be adopted. Therefore, the study was properly explained to the volunteers and their participation was conditioned upon their agreement with the Informed Consent Form. The project was submitted and approved by the Human Research Ethics Committee of the Federal University of São Carlos (Opinion number 2.069.671/2017), CAEE 65119517.1.0000.5504.

Results

Table 2 shows the sociodemographic characteristics of the caregivers. In the HIG, the mean age of the participants was 52.2 years old (±15.3), with a prevalence of females (88.2%), average school level of 8 .8 years (±4.2), 52.9% married, and 64.7% with a monthly income of one minimum wage. We observed that 52.9% of these caregivers were children of the recipient of care and 64.7% lived with them. Regarding the CG, the mean age of the participants was 55.1 years old (±18.2), predominantly female (95%), mean education of 9.3 years (±3.7), married (55%), monthly income of up to one minimum wage (70%) and, in this group, 60% of the volunteers were their daughters or sons and 65% of them lived with the elderly person.

Table 2. Demographic information of intervention and control groups. São Carlos-SP, 2018.

Variables	HIG (n=17)	CG (n=21)	HIG *vs.* CG
Age	52.5 (±15,3)	55.1 (±18.2)	T=-0.458; p=0.650[2]
20-39 years old	11.8%	20.0%	
40-59 years old	64.7%	35.0%	
≥60 years old	23.5%	45.0%	
Gender			p=0.350[1]
Male	11.8%	5.0%	
Female	88.2%	95.0%	
Education level	8.8 (±4,2)	9.35 (±3.7)	T=-0.359; p=0.722[2]
Illiterate	5.9%	-	
1-4 years	17.6%	20.0%	
5-8 years	23.5%	30.0%	
≥9 years	47.1%	45.0%	
Missings	5.9%	5.0%	
Marital Status			NA
Single	29.4%	35.0%	
Married	52.9%	55.0%	
Widower	11.8%	5.0%	
Separate	5.9%	5.0%	

Table 2. Continued...

Variables	HIG (n=17)	CG (n=21)	HIG *vs.* CG
Individual income			NA
<1 Minimum Wage	11.8%	5.0%	
1 Minimum Wage	64.7%	70.0%	
2 Minimum Wages	17.6%	10.0%	
3 Minimum Wages	5.9%	15.0%	
Family income			NA
<1 Minimum Wage	5.9%	-	
1 Minimum Wage	41.2%	45.0%	
2 Minimum Wages	35.3%	30.0%	
3 Minimum Wages	17.6%	25.0%	
Kinship			NA
Husband/wife	17.6%	10.0%	
Son/Daughter	52.9%	60.0%	
Grandson/Granddaughter	11.8%	15.0%	
Others	17.6%	15.0%	
Living with the elderly person			
Yes	64.7%	65.0%	p=0.269[1]
No	35.3%	35.0%	

NA= Not assessed. [1]Fisher's exact test for proportions. [2]Student's t-test for continuous variables.

Regarding care, Table 3 shows that the HIG had a lower mean in years of care (5.7 years) and in the number of daily hours (15.3 hours) dedicated to the care activity when compared to the CG (7.1 years and 16.5 hours). Regarding the information that the caregiver reported about AD and care, both groups had sufficient knowledge (above 85%). In the HIG, food was the most mentioned care activity by volunteers (88.2%), followed by body hygiene (82.4%). In the CG, medication (95%) and going to medical appointments and food (75%) were the most provided care. Among the morbidities questioned to caregivers, Systemic Arterial Hypertension was the most incident in the HIG, present in 29.4%, and was Diabetes Mellitus and Systemic Arterial Hypertension in the CG, representing 35.0%.

Table 3. Context of care and incidence of morbidity in the intervention and control groups. São Carlos-SP, 2018.

Variables	HIG (n=17)	CG (n=21)	HIG *vs.* GC
Care time	5.7 years (±4.5)	7.1 years (±4,5)	T=-0.905; p=0.372[2]
Days of the week	6.0 (±1.2)	5.3 (±1,1)	T=-1.808; p=0.079[2]
Hours per day	15.3 (±8.7)	16.5 (±8,1)	T=-0.413; p=0.682[2]
Alzheimer's information			
Yes	88.2%	95.0%	p=0.584[1]
No	11.8%	5.0%	
Care information			
Yes	94.1%	95.0%	p=0.715[1]
No	5.9%	5.0%	

Table 3. Continued...

Variables	HIG (n=17)	CG (n=21)	HIG *vs.* GC
Care activities			
Body hygiene	82.4%	55.0%	p=0.094[1]
Oral hygiene	70.6%	55.0%	p=0.498[1]
Eliminations	70.6%	25.0%	**p=0.009**[1]
Food	88.2%	75.0%	p=0.416[1]
Medication	76.5%	95.0%	**p=0.036**[1]
Sleep/rest	76.5%	60.0%	p=0.319[1]
Physiotherapy	11.8%	20.0%	p=0.667[1]
Medical appointment	70.6%	75.0%	p=0.526[1]
Activities			
Church	17.6%	40.0%	p=0.169[1]
Community groups	5.9%	10.0%	p=0.562[1]
Clubs	11.8%	10.0%	p=0.633[1]
Social assistance	-	5.0%	NA
Others	11.8%	-	NA
Morbidities			
Dyslipidemias	-	-	NA
Arterial hypertension	29.4%	35.0%	p=0.498[1]
Diabetes	17.6%	35.0%	p=0.209[1]
Cardiac disease	5.9%	5.0%	p=0.715[1]
Osteoporosis	11.8%	-	NA
Arthrosis	23.5%	5.0%	p=0.123[1]
Spine	5.9%	20.0%	p=0.225[1]
Other diseases	41.2%	45.0%	p=0.540[1]
Total morbidities	1.3 (±0.9)	1.3 (±0.8)	T=0.186; p=0.854[2]

NA= Not assessed. [1]Fisher's exact test for proportions. [2]Student's t-test for continuous variables.

The evaluations of the pre- and post-intervention groups were carried out concomitantly. For the HIG, cognitive training was conducted weekly, for 45 minutes, over the 12 weeks. For the CG, no time was set for reading the health education and promotion booklet. All participants were accompanied by phone calls to clarify their doubts and ensure that the stipulated time was respected.

Table 4 shows the information about the variables evaluated in the pre- and post-intervention moments. As for the HIG, there was a significant improvement between the moments before and after the intervention in the general cognition indicated by the MMSE (p=0.008) and by the ACE-R (p=0.003). There was an improvement in the cognitive domains of attention and orientation (p=0.004), in memory (p=0.017) and in verbal fluency (p=0.023). There was also a significant difference in the means of perceived stress (p=0.027) and anxiety symptoms (p=0.008) of caregivers after the intervention. Means of depressive symptoms and overload of these caregivers decreased, but not significantly.

As for the CG, verbal fluency was the only cognitive domain with significant improvement in the reassessment (p=0.007). Mean perceived stress (p=0.031) and anxiety symptoms (p=0.049) of caregivers in the CG also decreased significantly.

When analyzing the comparison between the intervention and control groups in the post-intervention moment, there was a significant difference in general cognition by the ACE-R (p=0.012) and in the attention/orientation domain (p=0.005) when compared to each other. A difference in the language domain was also observed in both pre (p=0.029) and post-intervention (p=0.011) moments.

Table 4. Outcome information before and after the intervention of the home intervention and control groups. São Carlos-SP, 2018.

Variables	HIG (n=17)		Pre *vs.* post[1]	CG (n=20)		Pre *vs.* post[1]	HIG *vs.* CG[2]	HIG *vs* CG[2]
	Pre	Post		Pre	Post		Pre	Post
ACE-R	82.2 (±10.9)	89.9 (±7.0)	**T=-3.4; p=.003**	80.8 (±13.4)	81.5 (±11.7)	T=-0.5; p=.613	T=0.4; p=.631	**T=2.6; p=.012**
Attention/Guidance	16.0 (±1.2)	17.0 (±1.1)	**T=-3.3; p=.004**	15.5 (±2.6)	15.1 (±2.6)	T=0.8; p=.394	T=0.8; p=.413	**T=3.0; p=.005**
Memory	19.2 (±5.5)	22.1 (±2.9)	**T=-2.6; p=.017**	18.6 (±5.8)	19.9 (±4.4)	T=-2.0; p=.060	T=0.3; p=.717	T=1.7; p=.081
Verbal fluency	9.2 (±3.1)	11.4 (±2.0)	**T=-2.5; p=.023**	10.0 (±3.3)	10.8 (±2.8)	**T=-3.0; p=.007**	T=-0.7; p=.454	T=0.8; p=.427
Language	24.6 (±1.6)	24.7 (±1.3)	T=-0.5; p=.608	22.9 (±2.8)	22.4 (±3.4)	T=0.6; p=.504	**T=2.2; p=.029**	**T=2.7; p=.011**
Visual-spatial	13.5 (±2.9)	14.4 (±2.0)	T=-1.4; p=.172	13.6 (±2.7)	13.1 (±3.4)	T=0.9; p=.358	T=0.1; p=.948	T=1.3; p=.172
MMSE	24.4 (±2.3)	26.0 (±1.4)	**T=-3.0; p=.008**	25.1 (±3.3)	25.6 (±2.6)	T=-0.8; p=.387	T=-0.4; p=.483	T=0.5; p=.577
Depression	11.1 (±9.3)	7.0 (±6.0)	T=2.0; p=.059	9.9 (±6.0)	9.4 (±5.3)	T=0.5; p=.620	T=0.4; p=.646	T=-1.3; p=.202
Stress	32.7 (±6.0)	29.0 (±5.6)	**T=2.4; p=.027**	33.7 (±6.2)	30.8 (±4.5)	**T=2.3; p=.031**	T=-0.4; p=.648	T=-1.0; p=.306
Anxiety	11.4 (±9.5)	6.8 (±7.3)	**T=3.0; p=.008**	10.2 (±6.1)	8.6 (±4.5)	**T=2.1; p=.049**	T=0.4; p=.643	T=-0.8; p=.377
Overload	25.5 (±13.1)	22.4 (±12.2)	T=1.2; p=.247	28.9 (±15.5)	28.4 (±14.9)	T=0.2; p=.792	T=-0.7; p=.479	T=-1.1; p=.194

ACE-R= *Addenbrooke's Cognitive Examination-Revised*; MMSE= Mini-mental state exam. [1]T-test for paired samples. [2] T-test for independent samples.

Discussion

The sociodemographic profile of this study indicated that most caregivers are between 40 and 59 years old, female, with an education level of more than nine years, married marital status, individual and family income of one minimum wage, is represented mostly by the children of the elderly patient who lived with them, corroborating other research in the area (Cesário et al., 2017; Diniz et al., 2018).

The cultural factor attributed to women in the context of care refers to longer life expectancy and the propensity of being younger than their spouses. Also, age has been related to the traditionalist principle of the sexual division of labor, that is, women are more likely to take care of children and perform household chores, while men are responsible for providing financial support to the family (Cesário et al., 2017).

Regarding the level of education in this study, most participants were represented by people with nine or more years of education (HIG - 47.1% and in the CG - 45.0%), corroborating the findings of other studies (Leite et al., 2017; Diniz et al., 2018). This is an essential factor for elderly care, as education is a factor that influences access to quality information, management of stressful situations, and also psychological dispositions and productive activities (Alexandre et al., 2014; Leite et al., 2017; Diniz et al., 2018).

From the perspective of the marital relationship of caregivers, most of them were married caregivers (52.9% - HIG) and (55.0% - CG). The same occurred in the study by Casemiro et al. (2016), in which most caregivers had stable relationships. The care of the elderly person is added to other tasks and responsibilities, such as taking care of the house, preparing meals, and meeting the needs of the children, which can result in an overload of activities (Santos & Koetz, 2017). In some cases, exercising long-term care can interfere with the couple's socialization and the reduction of visits to their homes, given the dedication, often exclusively to the elderly patient (Santos & Koetz, 2017).

Regarding coexistence, most caregivers in both groups live with the elderly person, which can be something positive, as home care provides close treatment and assiduous improvement in recovery, in addition to the proximity of care and strengthening of affective bonds (Santos & Koetz, 2017). However, living with the elderly patient increases the workload, which can generate greater overload for the caregiver (Martins et al., 2019).

The individual income of caregivers was mostly represented by up to one minimum wage, corroborating the study by Aires et al. (2020), in which most caregivers live on their income and used to meet the expenses from the care of the elderly patient. Financial overload is a generator of stress and physical wear, as, in some cases, caregivers are unable to acquire secondary work while caring, and showing impairment in leisure and social interaction (Aires et al., 2020).

When analyzing the context of caregivers in terms of the time they exercise the function of being a caregiver, in the HIG, the average was lower (5.7 years) than in the CG (7.1 years). This fact differs from the study by Fagundes et al. (2017), in which most family caregivers of elderly people with dementia provide care for a period between 1 to 5 years. The average number of hours dedicated to caring was lower in the HIG (15.3 hours) than in the CG (16.5 hours). However, this work is similar to the study by Aravena & Alvarado (2010), since these authors consider that the overload on informal caregivers is associated with a workload of more than eight hours of work. The greater time dedicated to care added to the performance of numerous tasks, constitutes an obstacle to the search for support by informal caregivers, leading to difficulties in accessing health services that have negative consequences for these individuals (Leite et al., 2017; Martins et al., 2019).

Regarding the information of AD and care, both groups had sufficient knowledge (above 85%), which is in agreement with the study by Santos et al. (2018). As for the presence of morbidities in caregivers, the most prevalent in the HIG was Systemic Arterial Hypertension (29.4%) and in the CG were Diabetes and Systemic Arterial Hypertension (representing 35.0%). These data corroborate the findings of a study carried out in Rio de Janeiro with 94 caregivers of elderly people with dementia, in which 46.7% of the caregivers had Systemic Arterial Hypertension and 15.2% Diabetes

(Leite et al., 2017). It is important to highlight that some caregivers were already at an advanced age, demonstrating the need for collaboration from other people to maintain care and the importance of monitoring the caregivers' health.

Regarding the activities that demand more attention from caregivers, food (88.2%) and body hygiene (82.4%) were mainly reported in the HIG, while in the CG it was medication (95%), going to medical appointments (75%), and food (75%). Caregivers face daily responsibilities required by care and which, associated with other tasks, can result in an increased probability of overload in this population (Cesário et al., 2017). This factor is added due to the attributions performed in an elderly person who has behavioral and mental disorders, making the caregiver vulnerable to negative outcomes (Cesário et al., 2017). The study by Aires et al. (2020) demonstrated that caregivers felt overloaded by the fact of performing various activities of care for the elderly at home, such as responsibilities of the household and financial administration, generating an accumulation of tasks.

The intervention carried out with caregivers proved to be efficient in improving the cognitive domains of memory and verbal fluency, in addition to the general cognition identified by the ACE-R and the MMSE. Interventions with the same characteristics of this current research should be encouraged as a tool for cognitive improvement in this population, since the impairment of cognition can lead to adverse outcomes, such as anxiety and depression symptoms, social isolation, mood changes, among others (Castro & Souza, 2016).

The study by Gates et al. (2011) carried out a systematic review on the effectiveness of cognitive training strategies in people with mild neurocognitive disorders and showed positive results in different analyzed variables, indicating the feasibility of this tool for improving cognitive performance. A survey conducted with healthy elderly people undergoing cognitive training observed improvement in general cognition assessed by the ACE-R ($p=0.082$), in addition to symptoms of depression ($p=0.048$) and anxiety ($p=0.002$), similar to the findings of this study (Casemiro et al., 2016)

According to the results, the overload of caregivers did not improve significantly after the intervention. This result can be attributed to the fact that the offer of the intervention for 12 weeks was not enough to reach the level of improvement in the overload.

On the other hand, this study showed an improvement in the assessment of anxiety and depression symptoms of caregivers after the intervention. According to Lopes & Cachioni (2013), psychoeducational interventions have a positive impact on reducing overload, depression, anxiety, promoting well-being, and self-knowledge about care demands. This can be seen in the study by Blom et al. (2015), in which family caregivers showed reduced symptoms of anxiety and depression after an internet intervention. This corroborates the results of this study, since, after the intervention, positive effects were observed on the caregivers' anxiety symptoms.

In this study, both groups had an improvement in perceived stress; however, informal caregivers in the HIG showed a better average. According to a study that evaluated the stress and quality of life of family caregivers of elderly people with AD, stress coping strategies for elderly caregivers are fundamental, as they help to understand psychological well-being (Cesário et al., 2017). Factors such as a feeling of overload resulting from a greater workload dedicated to caring, the complexity of care, and

ignoring their needs can increase the probability of these individuals manifesting depressive and anxiety symptoms (Nobre et al., 2015).

The CG participants also had significant improvements in anxiety and stress symptoms. This finding may be related to the fact that this group received guidelines for using the educational booklet created for the study, with information on health promotion based on the website of the Brazilian Alzheimer's Association.

The role of occupational therapy in stimulating and training cognitive skills through the use of tools such as concentration, perception, psychoeducation, and reminiscence exercises can provide the acquisition, association, storage, and evocation of observations and information, demonstrating the fundamental importance of the area in aspects of prevention, treatment, and rehabilitation of both people living with Alzheimer's disease and their caregivers, enabling them to improve their functional, cognitive and occupational performance in daily activities, remaining independent and autonomous for as long as possible (Conselho Regional de Fisioterapia e Terapia Ocupacional, 2021).

Some limitations of this study were the small sample size, as few caregivers accepted to participate in the research. Also, we have the scarcity of studies that demonstrate the effects of applying cognitive interventions with caregivers, with different methods for assessment and variety of training used in the research, hindering to discuss and compare the results.

Conclusion

The results of this research showed that the psychoeducational intervention focused on cognitive training at home caused positive effects in improving cognitive performance, especially in the domains of memory, attention, orientation, and language, and also the symptoms of perceived stress and anxiety in informal caregivers of the elderly person with Alzheimer's disease.

Intervention strategies with assessments to verify their effects are essential for understanding the real impact on the health of these caregivers, enabling and highlighting the need for Gerontology in line with the health team, aiming at providing care not only to the older adult but also to those who dedicate to the activity of caring.

In this sense, this study can contribute to future investigations for the development of home interventions for caregivers, so that they can favor their physical and mental health.

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Author´s Contributions

Ana Julia de Souza Caparrol was responsible for the conception and design of the project, data collection and analysis, and writing of the article. Gabriela Martins was responsible for writing the article, collecting and

interpreting data. Gustavo Carrijo Barbosa was responsible for the critical review and writing of the article. Aline Cristina Martins Gratão was responsible for the critical review of the article and approval of the final version to be published. All authors approved the final version of the article.

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