Long-term individual cognitive stimulation program in patients with mild neurocognitive disorder: a pilot study

Susana I. Justo-Henriques, Ana E. Marques-Castro, Patricia Otero, Fernando L. Vázquez, Ángela J. Torres

Introduction. There is evidence to suggest that cognitive stimulation produces cognitive benefits in people with mild neurocognitive disorder. However, the effect has been previously demonstrated to be minimal to moderate and the effect of long-term individual interventions, namely on specific cognitive domains, is unknown.

Aim. To assess the efficacy, feasibility and acceptability of a long-term individual cognitive stimulation intervention for patients with mild neurocognitive disorder.

Patients and methods. Patients (n = 30) with mild neurocognitive disorder were assigned to a cognitive stimulation intervention group (n = 15) or to a control group (n = 15). The intervention consisted of 88 individual sessions, approximately 45 minutes long, with two sessions per week. External evaluators assessed the level of alteration in cognitive performance, depressive symptoms and the level of independence in the performance of basic activities of daily living.

Results. After the intervention, a significant improvement was found in the intervention group compared to the control group in overall cognitive performance (d = 0.83), specifically in the language domain (d until 1.50). There were also lower depressive symptoms in the intervention group compared to the control group (d = 0.93). Only 6.7% of the participants dropped out the study, with participants attending a mean of 83 ± 12.1 sessions.

Conclusions. The results support the efficacy, feasibility and acceptability of the intervention for mild neurocognitive disorder and justify a randomized controlled trial of the program with a larger sample.

Key words. Cognitive stimulation. Elderly. Individual intervention. Mild cognitive impairment. Mild neurocognitive disorder. Non-pharmacological therapy.

Cediara – Social Solidarity Association of Ribeira de Fráguas; Ribeira de Fráguas, Portugal (S.I. Justo-Henriques, A.E. Marques-Castro). Department of Psychology; University of A Coruña; A Coruña, Spain (P. Otero). Department of Clinical Psychology and Psychobiology (F.L. Vázquez); Department of Psychiatry, Radiology, Public Health, Nursing and Medicine (A.J. Torres); University of Santiago de Compostela; Santiago de Compostela, A Coruña, Spain.

Corresponding author:
Susana Isabel Justo Henriques. Cediara – Social Solidarity Association of Ribeira de Fráguas. Rua da Alagoa, 3. Casaldelo. 3850-705 Ribeira de Fráguas, Albergaria-a-Velha, Portugal.

E-mail:
cediara.dir.tec@gmail.com

Accepted:
05.11.18.

How to cite this paper:
Justo-Henriques SI, Marques-Castro AE, Otero P, Vázquez FL, Torres AJ. Long-term individual cognitive stimulation program in patients with mild neurocognitive disorder: a pilot study. Rev Neurol 2019; 68: 281-9. doi: 10.33588/rn.6807.2018321.

Versión española disponible en www.neurologia.com

Introduction

We are currently witnessing an unprecedented population aging. In Europe, 19.1% of the population is over 65 years old [1], and in 2,050 this percentage will reach 35.0% [2]. One of the most common mental health problems in the elderly is mild neurocognitive disorder [3], which is defined by evidence of a moderate cognitive impairment compared with a previous performance level of the subject in one or more cognitive domains, but without interfering in their activities of daily living, in the absence of delirium or other mental disorder [4].

Evidence suggests that, despite the degeneration that occurs in the brain throughout the aging process, it does not lose its ability to regenerate and change connection patterns [5], and people with mild neurocognitive disorder maintain neuroplasticity, which can be stimulated by cognitive stimulation interventions [6]. In fact, cognitive stimulation programs have shown their efficacy in interventions with subjects with neurocognitive disorders, regardless of the effects of medication [7, 8], and are advised by the National Institute for Health and Clinical Excellence (NICE) [9] as a standard intervention for people with mild and moderate neurocognitive disorder. However, the quality of the studies evaluating the effectiveness of the cognitive stimulation programs is variable and generally low [7,8]. Most studies have used small samples [10-12], few indicate the existence of a manual [13-15] or previous training of the professionals before the intervention [10,14-16].

Furthermore, some studies had a high percentage of dropouts during the intervention [17]. This is probably one of the reasons why the effect size found was small to medium [8]. Similarly, most interventions had a relatively short duration (30 hours on average, over 14-18 sessions) [16,18], which may be insufficient to treat these degenerative conditions. On the other hand, most interventions have been administrated upon a group context [11,16]. The individual format can increase access to the intervention, especially for subjects who are not able

to be included in groups because of limited services, personal preferences, health or behavioral problems. Nonetheless, only the study by Matsuda [12] has an individual intervention conducted by professionals, although no significant differences between the intervention and control conditions were found. Finally, except for the study by Spector et al [14], in literature, no studies were found evaluating the effect of interventions in specific cognitive domains.

Therefore, there is no data on the effect of protocolized and manualized interventions, with a greater number of sessions and applied to an individual context and evaluating the gains of the intervention in specific cognitive domains. The aim of this pilot study was to evaluate the efficacy of long-term individual cognitive stimulation program on specific domains in patients with mild neurocognitive disorder, as well as its feasibility and acceptability.

Patients and methods

Sample

The sample was obtained between May and August of 2014 through the screening of the users of Cediara Association (a non-profit organization with psychosocial support for the elderly located in Ribeira de Fráguas) and the local government of Ribeira de Fráguas. Both are located in the district of Aveiro (Portugal), which has an approximate population of 714,000 inhabitants. Specifically, the users of the Day Center of Cediara were successively selected and assigned to the intervention group; while people from the community with the same geographical origins as the previous and matched in terms of gender, age, education level and mild neurocognitive disorder level, identified with the collaboration of the City Council and the Health Center of Ribeira de Fráguas, were assigned to the control group.

To participate in the study, the subjects had to meet the following inclusion criteria: adults of both genders had to be over 50 years old, having a mild neurocognitive disorder according with the criteria within the *Diagnostic and Statistical Manual of Mental Disorders, 5th edition* (DSM-5) [4] diagnosed by a clinician, having a score between 10 and 24 in the Mini-Mental State Examination (MMSE) [19,20], having the intention to participate in every intervention and evaluation sessions, and providing informed consent. The exclusion criteria were having received psychological or psychiatric care in the previous two months, having a condition that requires an immediate intervention (e.g. suicidal ideation) or that interferes with the participation in the study (e.g. severe auditory deficit), inability to communicate adequately, limiting the participation in the intervention and the correct use of the materials determined by the researchers, having a medical condition that endangers the survival of the person in the following 12 months, foreseeing a change of address in the following 12 months and participating in another study.

In a total of 86 subjects evaluated, 34 (39.5%) met the inclusion and exclusion criteria and were invited to participate in the study. Of these, 4 (4.7%) declined to participate due to lack of interest in the study and the absence of financial reward for participating. As shown in table I, the final sample consisted of 30 participants, 15 assigned to the intervention group and 15 assigned to the control group; 73.3% were women and the age average was 78.8 years old. Most participants did not have a partner (63.3%), had up to the 4th year of schooling (66.6%), lived with relatives (60.0%), had worked outside home (56.7%), was receiving an income up to 500 euros per month (80.0%) and was suffering from dementia (90.0%). No statistically significant difference was found between the groups regarding the subjects' sociodemographic variables. In the cognitive stimulation group, two subjects (6.7%) dropped out of the intervention (Figure).

This study was conducted in accordance with the latest review of the Declaration of Helsinki (2013) and obtained the approval of the Bioethics Committee for the University of Santiago de Compostela (Spain). All subjects participating in the study provided informed consent. The participation was entirely voluntary without any economic or other incentive.

Instruments

Instrument were applied at pre-intervention (baseline) and post-intervention (12 months) by a previously trained independent evaluator and blind to the aims of the study and the assignment of the subjects to the different conditions.

To evaluate the sociodemographic variables a sociodemographic characterization questionnaire was used. Cognitive performance was assessed by means of the MMSE with an internal consistency (Cronbach's α) of 0.89 [19,20] and with the Montreal Cognitive Assessment (MoCA), with an internal consistency of 0.83 [21, 22]. To evaluate the depressive symptoms the Geriatric Depression Scale-15 was used, with an internal consistency of 0.83 [23, 24]. To evaluate the autonomy level in the activities

of daily living the Barthel Index was used, with an internal consistency of 0.96 [25,26]. Attendance to the intervention sessions and dropouts were evaluated through a record sheet elaborated *ad hoc* for this study.

Intervention and control group

Cognitive stimulation intervention

Before the study, a manual for the cognitive stimulation program based on the Apóstolo and Cardoso program [27] was developed, which was based on the intervention program *Making a Difference* of Spector et al [16,28], which has proved its efficacy as a cognitive stimulation method [8].

The main objective of the present intervention was to train the cognitive domains (especially orientation, attention, memory, reasoning, calculation and language). All sessions followed the same structure. The first five minutes were reserved to welcome the participant and the following 10 minutes were dedicated to reality orientation therapy using a space-time orientation chart. In the following 25 minutes, cognitive domains were trained using cognitive stimulation tools: *Bingos Seniores* ®, which includes the bingo of the journey to the past (based on the reminiscence therapy, facilitating the episodic memory), the fruit bingo (stimulates the short term and semantic memory) and the sound bingo (trains the sensory memory, semantics and eye-hand coordination); and *Roletas da Memória* ®, which includes Maths, Portuguese and activities of daily living exercises. The last five minutes were dedicated to the return to calmness, closing the session and farewell.

The intervention was applied by means of 88 45-minute long individual sessions, two sessions per week, by two therapists with three to five years' experience in the cognitive stimulation field and previously trained by an expert in clinic psychology with six years' experience, through a theoretical-practical training of 160 hours. No significant difference was found among the results obtained by the therapists regarding those of MMSE (U = 18.5; z = –1.11; p = 0.269), MoCA (U = 19.5; z = –0.99; p = 0.323), GDS (U = 28; z = 0; p = 1.000) and Barthel Index (U = 22.5; z = –0.66; p = 0.513).

Control group

In this group, the participants did not have contact with the therapists. They did not receive any intervention, nor was any material given to the participants. Only the assessment tools were applied at the same moment as the intervention group (pre and post-intervention). However, access to the necessary care for their cognitive deficit was not restricted.

Table I. Sociodemographic characterization of the sample.

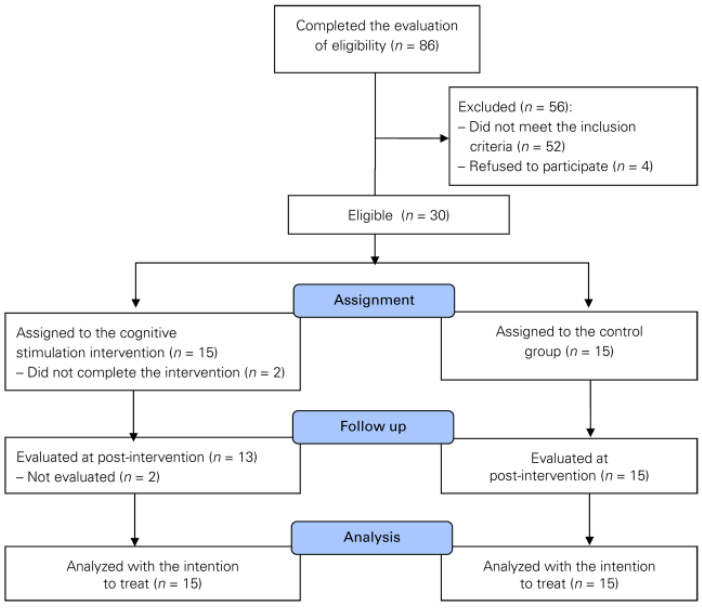
		Total (n = 30)	Intervention group (n = 15)	Control group (n = 15)	χ^2 / FET / FFHET / U	p
Gender	Female	22 (73.3%)	11 (73.3%)	11 (73.3%)	FET	1.000
	Male	8 (26.7%)	4 (26.7%)	4 (26.7%)		
Age (years)	Mean ± SD	78.8 ± 11.6	79.1 ± 11.6	78.5 ± 11.9	U = 102.0	0.662
	Range	50-90	51-90	50-90		
Marital status	Single	19 (63.3%)	10 (66.7%)	9 (60.0%)	χ^2 = 0.14	0.705
	Married	11 (36.7%)	5 (33.3%)	6 (40.0%)		
Education level	Illiterate	10 (33.3%)	6 (40.0%)	4 (26.7%)	χ^2 = 0.60	0.439
	Up to 4th grade	20 (66.6%)	9 (60.0%)	11 (73.3%)		
Housing company	Alone	6 (20.0%)	4 (26.7%)	2 (13.3%)	FFHET	0.303
	Spouse	6 (20.0%)	1 (6.7%)	5 (33.3%)		
	With relatives	18 (60.0%)	10 (66.7%)	8 (53.3%)		
Previous profession	Domestic	13 (43.3%)	6 (40.0%)	7 (46.7%)	χ^2 = 0.14	0.713
	Working out of the house	17 (56.7%)	9 (60.0%)	8 (53.3%)		
Income	≤ 500 euros	24 (80.0%)	12 (80.0%)	12 (80.0%)	FFHET	1.000
	501-750 euros	3 (10.0%)	1 (6.7%)	2 (13.3%)		
	≥ 751 euros	3 (10.0%)	2 (13.3%)	1 (6.7%)		
Clinical condition	Dementia	27 (90.0%)	14 (93.3%)	13 (86.7%)	FFHET	1.000
	Stroke	1 (3.3%)	1 (6.7%)	0		
	TBI	1 (3.3%)	0	1 (6.7%)		
	Multiple sclerosis	1 (3.3%)	0	1 (6.7%)		

FET: Fisher's exact test; FFHET: Fisher-Freeman-Halton exact test; SD: standard deviation; TBI: traumatic brain injury.

Statistical analysis

The statistical analysis was conducted with the SPSS program v. 20.0. To analyze the homogeneity of the samples of both conditions in the categorical variables of the baseline, χ^2 (or Fisher's exact test or the

Figure. Flow diagram of the phases of the study.



Fisher-Freeman-Halton exact test with expected values lower than 5) was used and for the continuous variables the Mann-Whitney *U* test for two independent samples was used. Analysis was performed under the principle of the intention to treat. All participants were analyzed in the group to which they were assigned; the scores lost in the variables of cognitive performance, depressive symptomatology and autonomy in the basic activities of daily living were replaced by those of the previous measure (imputation of the last observation made).

To evaluate the differences in cognitive performance, depressive symptoms and level of autonomy in the activities of daily living between both groups, in the pre and post-intervention (intergroup differences), as well as to evaluate the difference between therapists in the outcome variables, the Mann-Whitney *U* test for independent samples was conducted. The change in participants' scores in the outcome variables between the pre and post-intervention evaluations (intragroup differences) was determined by means of the Wilcoxon test for related samples. Cohen's *d* was calculated to estimate the effect size [29], according to the following interpretation: *d* = 0.2 (small), 0.5 (medium) and 0.8 (large).

To evaluate the adherence to the intervention, the distribution of frequencies was analyzed and the Mann-Whitney *U* test for independent samples was conducted, to assess the difference between both groups regarding the dropout of participants. In addition, the distribution of frequencies and the descriptive statistics of the attended sessions were analyzed.

Results

Intergroup differences

Table II shows the scores of the intergroup analysis, in the several analyzed variables.

Regarding the cognitive performance, Mann-Whitney *U* test did not reveal significant differences in pre-intervention evaluation between the intervention and control groups. In the post-intervention evaluation, no difference was found in MMSE scores. However, significantly better cognitive performance in the MoCA scores in the intervention group were found in comparison with the control group (U = 61.50; z = –2.12; p = 0.034) with a large effect size (d = 0.83). When analyzing the domains, in post-intervention, a significantly higher performance in the intervention group was only evident in the language domain in MMSE (U = 65.50; z = –2.13; p = 0.033) with a medium effect size (d = 0.58) and in MoCA (U = 37.50; z = –3.29; p = 0.001), with a large effect size (d = 1.50).

Concerning the depressive symptomatology, no significant difference was found in pre-intervention between the intervention and the control groups. However, in post-intervention, a significantly lower depressive symptomatology was found in the intervention group in comparison with the control group (U = 60.50; z = –2.17; p = 0.03) with a large effect size (d = 0.93).

Finally, regarding the level of autonomy in the activities of daily living, no significant differences were found between the intervention and control groups, both in pre and post- intervention.

Intragroup differences

Table III shows the scores of the variables analyzed in each group in the pre and post-intervention evaluations (intragroup analysis).

Regarding cognitive performance, a significant difference between pre-intervention and post-intervention in the intervention group was found, both in MMSE (z = –2.44; p = 0.015) and in MoCA (z = –2.18; p = 0.029), with medium effect sizes (d = 0.72 and d = 0.71, respectively). On the other hand, no difference was found between pre-intervention and

post-intervention in the control group, regarding cognitive performance. In the analysis of domains, a significant difference was found only in language in the intervention group (z = –2.71; p = 0.007), with a large effect size (d = 0.95).

Concerning the depressive symptoms, no significant difference was found in the intervention group, between pre and post-intervention. However, in the control group significantly higher depressive symptoms in post-intervention were found in comparison with pre-intervention (z = –2.75; p = 0.006) with a large effect size (d = 0.94).

Regarding the level of autonomy in the activities of daily living, no significant difference was found between pre and post-intervention both in the intervention and in the control groups.

Adherence to the intervention

Concerning the dropouts, 2 (6.7%) of the 15 participants in the intervention group were deceased, that causing no significant differences between the groups (p = 0.483; Fisher's exact test). Of the 88 sessions that composed the intervention, participants of the intervention group attended an average of 83 ± 12.1 sessions. A total of 8 (53.3%) participants attended all the sessions planned and 13 (86.6%) attended more than 80.0% of the sessions.

Discussion

In this pilot study the efficacy, feasibility and acceptability of a cognitive stimulation program, in an individual context and with continuous exposure to cognitive stimulating activities (high number of sessions) in people with mild neurocognitive disorder was evaluated. It was found that after the intervention, there was an improvement in cognitive performance and the depressive symptomatology was reduced in the intervention group, in comparison with the control group, however no difference was found between groups regarding the level of autonomy in the activities of daily living. Furthermore, adherence to the intervention was adequate.

In the post-intervention it was found that the participants in the intervention group presented a better cognitive performance than the participants in the control group, with a large effect size. These results are in accordance with the ones found in previous studies [10,16,27]. Likewise, the effect size found is greater than the one found by Ortega et al [17]. On the other hand, these results are superior to those of other studies which did not find signifi-

Table II. Intergroup comparison in the pre and post-intervention regarding cognitive performance, depressive symptoms and level of autonomy.

	Instruments	Intervention group [a]	Control group [a]	*U*	*z*	*p*	Cohen's *d*
Pre-intervention	MMSE	20.1 ± 3.7	19.8 ± 3.4	100.0	–0.52	0.601	0.09
	Orientation	7.0 ± 1.6	6.6 ± 1.6	102.5	–0.43	0.669	0.25
	Registration	2.9 ± 0.3	3.0 ± 0.0	105.0	–1.00	0.317	0.37
	Attention and calculation	2.7 ± 1.7	2.5 ± 1.7	104.5	–0.34	0.736	0.56
	Recall	1.0 ± 1.1	1.3 ± 1.0	94.5	–0.78	0.436	0.25
	Language	6.5 ± 1.1	6.4 ± 0.9	104.0	–0.41	0.679	0.07
	Visuoconstructive ability	0.0 ± 0.0	0.1 ± 0.3	105.0	–1.00	0.317	0.37
	MoCA	11.5 ± 2.9	10.7 ± 3.7	101.5	–0.46	0.645	0.24
	Visuospatial/executive	1.1 ± 0.9	1.1 ± 0.8	112.5	0.00	1.000	0.00
	Naming	1.1 ± 0.7	0.9 ± 0.6	95.0	–0.81	0.417	0.30
	Attention	2.2 ± 1.8	1.7 ± 1.2	98.5	–0.59	0.552	0.30
	Language	1.3 ± 0.5	1.1 ± 0.9	100.0	–0.58	0.562	0.18
	Abstraction	0.7 ± 0.7	0.5 ± 0.5	97.0	–0.72	0.470	0.32
	Delayed recall	0.4 ± 0.7	0.8 ± 1.1	92.5	–0.995	0.320	0.43
	Orientation	4.7 ± 1.1	4.5 ± 1.2	102.0	–0.46	0.643	0.17
	GDS	6.4 ± 2.3	6.2 ± 2.5	104.5	–0.34	0.736	0.08
	Barthel Index	83.7 ± 18.5	71.7 ± 27.4	74.5	–1.60	0.109	0.51
Post-intervention	MMSE	22.1 ± 5.2	19.1 ± 4.1	67.5	–1.87	0.061	0.62
	Orientation	7.3 ± 1.9	6.7 ± 2.0	96.0	–0.69	0.488	0.27
	Registration	3.0 ± 0.0	3.0 ± 0.0	112.5	0.00	1.000	0.00
	Attention and calculation	3.5 ± 1.7	2.5 ± 2.0	74.5	–1.62	0.105	0.58
	Recall	1.5 ± 1.4	0.9 ± 1.1	85.5	–1.19	0.232	0.48
	Language	6.7 ± 1.2	6.0 ± 1.1	65.5	–2.13	0.033	0.58
	Visuoconstructive ability	0.1 ± 0.4	0.1 ± 0.3	105.0	–0.60	0.550	0.22
	MoCA	13.9 ± 4.6	10.2 ± 4.3	61.5	–2.12	0.034	0.83
	Visuospatial/executive	1.3 ± 1.03	1.2 ± 1.2	106.0	–0.29	0.775	0.06
	Naming	1.5 ± 0.9	0.8 ± 0.7	61.0	–2.27	0.053	0.71
	Attention	2.7 ± 1.5	1.9 ± 1.3	78.5	–1.44	0.150	0.57
	Language	1.9 ± 0.6	0.8 ± 0.8	37.5	–3.29	0.001	1.50
	Abstractrion	0.9 ± 0.7	0.5 ± 0.5	85.5	–1.24	0.214	0.52
	Delayed recall	1.1 ± 1.4	0.7 ± 1.2	99.0	–0.65	0.515	0.30
	Orientation	4.6 ± 1.4	4.3 ± 1.4	98.5	–0.60	0.550	0.20
	GDS	5.4 ± 2.6	8.1 ± 3.3	60.5	–2.17	0.030	0.93
	Barthel Index	79.0 ± 22.6	71.7 ± 27.7	90.0	–0.95	0.342	0.29

GDS: Geriatric Depression Scale; MMSE: Mini-Mental State Examination; MoCA: Montreal Cognitive Assessment.
[a] Mean ± standard deviation.

Table III. Intragroup comparison regarding cognitive performance, depressive symptoms and level of autonomy.

	Instruments	Pre-intervention [a]	Post-intervention [a]	*z*	*p*	Cohen's *d*
Intervention group	MMSE	20.1 ± 3.7	22.1 ± 5.2	−2.44	0.015	0.72
	Orientation	7.0 ± 1.6	7.3 ± 1.9	−0.83	0.409	0.19
	Registration	2.9 ± 0.3	3.0 ± 0.0	−1.00	0.317	0.26
	Attention and calculation	2.7 ± 1.7	3.5 ± 1.7	−1.92	0.055	0.58
	Recall	1.0 ± 1.1	1.5 ± 1.4	−1.59	0.112	0.47
	Language	6.5 ± 1.1	6.7 ± 1.2	−1.13	0.257	0.30
	Visuoconstructive ability	0.0 ± 0.0	0.1 ± 0.4	−1.41	0.157	0.38
	MoCA	11.5 ± 2.9	13.9 ± 4.6	−2.18	0.029	0.71
	Visuospatial/executive	1.1 ± 0.9	1.3 ± 1.0	−0.51	0.608	0.13
	Naming	1.1 ± 0.7	1.5 ± 0.9	−1.59	0.112	0.47
	Attention	2.2 ± 1.8	2.7 ± 1.5	−1.15	0.252	0.32
	Language	1.3 ± 0.5	1.9 ± 0.6	−2.71	0.007	0.95
	Abstraction	0.7 ± 0.7	0.9 ± 0.7	−0.82	0.414	0.21
	Delayed recall	0.4 ± 0.7	1.1 ± 1.4	−1.98	0.057	0.57
	Orientation	4.7 ± 1.1	4.6 ± 1.4	−0.71	0.480	0.18
	GDS	6.4 ± 2.3	5.4 ± 2.6	−1.55	0.122	0.42
	Barthel Index	83.7 ± 18.5	79 ± 22.6	−1.11	0.268	0.30
Control group	MMSE	19.8 ± 3.4	19.1 ± 4.1	−1.24	0.215	0.36
	Orientation	6.6 ± 1.7	6.7 ± 2.0	−0.54	0.593	0.13
	Registration	3.0 ± 0.0	3.0 ± 0.0	0.00	1.000	0.00
	Attention and calculation	2.5 ± 1.7	2.5 ± 2.0	0.00	1.000	0.00
	Recall	1.3 ± 1.0	0.9 ± 1.1	−1.86	0.063	0.54
	Language	6.4 ± 0.9	6.0 ± 1.1	−1.86	0.063	0.54
	Visuoconstructive ability	0.1 ± 0.3	0.1 ± 0.3	0.00	1.000	0.00
	MoCA	10.7 ± 3.7	10.2 ± 4.3	−0.94	0.345	0.28
	Visuospatial/executive	1.1 ± 0.8	1.2 ± 1.1	−0.33	0.739	0.08
	Naming	0.9 ± 0.6	0.8 ± 0.7	−0.38	0.705	0.09
	Attention	1.7 ± 1.2	1.9 ± 1.2	−0.71	0.480	0.18
	Language	1.1 ± 0.9	0.8 ± 0.8	−2.24	0.055	0.68
	Abstraction	0.5 ± 0.5	0.5 ± 0.5	0.00	1.000	0.00
	Delayed recall	0.8 ± 1.1	0.7 ± 1.2	−1.00	0.317	0.26
	Orientation	4.5 ± 1.2	4.3 ± 1.3	−0.91	0.366	0.23
	GDS	6.2 ± 2.5	8.1 ± 3.3	−2.75	0.006	0.94
	Barthel Index	71.7 ± 27.4	71.7 ± 27.7	−0.38	0.705	0.00

GDS: Geriatric Depression Scale; MMSE: Mini-Mental State Examination; MoCA: Montreal Cognitive Assessment.
[a] Mean ± standard deviation.

cant differences concerning the control group [11, 18]. Furthermore, a significant improvement between pre-intervention and post-intervention in the intervention group regarding the cognitive performance, with medium effect sizes was found; however, in the control group a decrease in cognitive performance was noted, although it was not statistically significant. This response to the intervention can be considered as positive according to the parameters of Chapman et al [30], which indicate that a positive response to the intervention in diseases characterized by a progressive decline of the brain is determined by an increase of the execution levels in cognitive settings, the maintenance of the abilities during a phase in which a decrease is expected or a slower degree of decline over time. One possible explanation for the large effect sizes found is the greater exposure to cognitive stimulating activities (1,980 hours in total) in comparison to the average of 30 hours in previous studies [8], distributed appropriately for this population through a great number of sessions (not too long) and a greater continuity in time. The decrease in the rhythm of therapy and a greater number of sessions presented in a structured way follow the recommendations of McGee and Bratkovich [31], to adapt the intervention to the reduced processing speed and the attention and memory deficits of the elderly people with neurocognitive disorders. Likewise, the regular stimulation over time can increase cognitive gains in the process of the progressive brain decline.

Concerning the domain analysis, intergroup gains in language were found in favor of the intervention group versus the control group, as well as intragroup differences in the intervention group (but not in the control group). This finding is consistent with the predominance of the verbal expression and the activities performed throughout the intervention and is also consistent with the results obtained by Spector et al [14]. One possible explanation for this finding is that it may be due to the effect of the cognitive stimulation therapy, which emphasizes the implicit learning by the linguistic abilities. Thus, the development of activities and the use of the materials by the participants encourage them to establish conversations, generate new perspectives and establish new semantic links [14]. Furthermore, it was found that the linguistic functions are the ones which suffer less deterioration over the years, remaining fairly stable throughout the life course and some aspects may even be improved, such as the acquisition of vocabulary, with the appropriate stimulation [32]. On the other hand, the language improvement found after the intervention may have a positive

impact on the quality of life of the people with mild neurocognitive disorder, allowing for a better communication with the people in their environment.

Concerning the depressive symptoms, after the intervention, the intervention group presented significantly fewer depressive symptoms than the control group, with a large effect size; moreover, there was a significant increase of the depressive symptoms in the control group, also with a large effect size. These findings may indicate that the progressive decline of the cognitive performance together with the fact of not being exposed to any type of intervention, has an influence on the emergence of depressive symptoms. These results are better than those obtained by Mapelli et al [33], who did not find any difference in depressive symptomatology.

Finally, no significant difference was found on the level of autonomy in the activities of daily living between the two groups after the intervention, nor between the pre-intervention and the post-intervention in each group, results being consistent with most previous studies [8]. In fact, only the study of Orrell et al [34] found significant changes in this variable. Some authors point out that this may be due to the fact that the behavioral outcome variables (such as feeding or dressing) are not able to detect the functional impact of the cognitive stimulation programs [35].

The percentage of dropouts was low (6.7%), which represents an improvement regarding previous studies in which dropouts reached up to 15.0% [10]. Moreover, the adherence to the sessions was high; on average, the subjects attended 83 sessions of the 88 that comprised the intervention (94.3%). This outcome is high in comparison with other studies that indicate an average attendance of 75.0% of the sessions [34]. It is possible these favorable outcomes are due to the fact that the sessions are individual, the contact is personalized, the technicians were close professionals, the contents of the sessions were easy to understand, and its duration was thought so as not to cause fatigue. In fact, these results were better than the ones found by Matsuda [12], in which 20 sessions were conducted by professionals, and the results obtained by Orgeta et al [17], with a maximum of 75 sessions conducted by trained relatives.

From this study important implications for research and clinical practice emerge. It provides explicit information to plan a future randomized controlled trial (calculation of sample size, sample selection, integrity of the study protocol) and provides evidence of feasibility of the study. This cognitive stimulation program can attenuate the cognitive loss of the subjects with mild neurocognitive disorder, thus delaying the disease progression, which constitutes a gain in terms of mental health and costs, both for the patients and for the caregivers and the families. Furthermore, it is one of the few cognitive stimulation interventions in individual format, administered by therapists.

However, we must be aware of some limitations. Due to the small sample size, the results must be interpreted with caution; they cannot be generalized or considered conclusive. Future studies with a larger sample are needed to confirm these results. The assignment of the participants to the groups was not random, although possible biases were controlled by pairing the baseline characteristics of the subjects. Moreover, in this study, no follow up evaluations were carried out, thus it was not possible to analyze whether the effects of the program are maintained over time. Future research should plan long follow-up periods with several evaluation moments.

In conclusion, this is the first pilot study of cognitive stimulation in an individual format for people with mild neurocognitive disorder, conducted by professionals and continuous exposure to cognitive stimulating activities which obtained medium to large effect sizes. The results suggest the efficacy, feasibility and acceptability of the program and encourage the development of randomized controlled trials to evaluate its effectiveness.

References

1. Eurostat. Population data. 2017. URL: http://ec.europa.eu/eurostat/data/database?node_code=proj. [09.07.2018].
2. United Nations. World population aging. Highlights. New York: United Nations; 2017.
3. World Health Organization. Mental health of older adults. 2017. URL: http://www.who.int/mediacentre/factsheets/fs381/en/. [09.07.2018].
4. American Psychiatric Association. Diagnostic and statistical manual of mental disorders, fifth edition (DSM-5). Washington DC: APA; 2013.
5. Mora F. Successful brain aging: plasticity, environmental enrichment, and lifestyle. Dialogues Clin Neurosci 2013; 15: 45-52.
6. Hill NL, Kolanowski AM, Gill DJ. Plasticity in early Alzheimer's disease: an opportunity for intervention. Top Geriatr Rehabil 2011; 27: 257-67.
7. Aguirre E, Woods RT, Spector A, Orrell M. Cognitive stimulation for dementia: a systematic review of the evidence of effectiveness from randomised controlled trials. Ageing Res Rev 2013; 12: 253-62.
8. Woods B, Aguirre E, Spector AE, Orrel M. Cognitive stimulation to improve cognitive functioning in people with dementia. Cochrane Database Syst Rev 2012; 15: CD005562.
9. National Institute for Health and Clinical Excellence (NICE). Dementia: assessment, management and support for people living with dementia and their carers. URL: https://www.nice.org.uk/guidance/ng97. [09.07.2018].
10. Alves J, Alves-Costa F, Magalhães R, Gonçalves OF, Sampaio A. Cognitive stimulation for Portuguese older adults with cognitive impairment: a randomized controlled trial of

efficacy, comparative duration, feasibility, and experiential relevance. Am J Alzheimers Dis Other Demen 2014; 29: 503-12.
11. Capotosto E, Belacchi C, Gardini S, Faggian S, Piras F, Mantoan V, et al. Cognitive stimulation therapy in the Italian context: its efficacy in cognitive and non-cognitive measures in older adults with dementia. Int J Geriatr Psychiatry 2017; 32: 331-40.
12. Matsuda O. Cognitive stimulation therapy for Alzheimer's disease: the effect of cognitive stimulation therapy in the progression of mild Alzheimer's disease in patients treated with donepezil. Int Psychogeriatr 2007; 19: 241-52.
13. Apóstolo JL, Cardoso DF, Marta LM, Amaral TI. Efeito da estimulação cognitiva em idosos. Revista de Enfermagem Referência 2011; 3: 193-201.
14. Spector A, Orrell M, Woods B. Cognitive stimulation therapy (CST): effects on different areas of cognitive function for people with dementia. Int J Geriatr Psychiatry 2010; 25: 1253-8.
15. Yamanaka K, Kawano Y, Noguchi D, Nakaaki S, Watanabe N, Amano T, et al. Effects of cognitive stimulation therapy Japanese version (CST-J) for people with dementia: a single-blind, controlled clinical trial. Aging Ment Health 2013; 17: 579-86.
16. Spector A, Thorgrimsen L, Woods B, Royan L, Davies S, Butterworth M, et al. Efficacy of an evidence-based cognitive stimulation therapy programme for people with dementia: randomized controlled trial. Br J Psychiatry 2003; 183: 248-54.
17. Orgeta V, Leung P, Yates L, Kang S, Hoare Z, Henderson C, et al. Individual cognitive stimulation therapy for dementia: a clinical effectiveness and cost-effectiveness pragmatic, multicentre, randomised controlled trial. Health Technol Assess 2015; 19: 1-108.
18. Cove J, Jacobi N, Donovan H, Orrell M, Stott J, Spector A. Effectiveness of weekly cognitive stimulation therapy for people with dementia and the additional impact of enhancing cognitive stimulation therapy with a carer training program. Clin Interv Aging 2014; 9: 2143-50.
19. Folstein M, Folstein SE, McHugh PR. Mini-Mental State. A practical method for grading the cognitive state of patients for the clinician. J Psychiatr Res 1975; 12: 189-98.
20. Guerreiro M, Silva AP, Botelho A, Leitão O, Castro-Caldas A, García C, et al. Adaptação à população portuguesa da tradução do 'Mini Mental State Examination' (MMSE). Revista Portuguesa de Neurologia 1994; 1: 9-10.
21. Nasreddine ZS, Phillips NA, Bédirian V, Charbonneau S, Whitehead V, Collin I, et al. The Montreal Cognitive Assessment, MoCA: a brief screening tool for mild cognitive impairment. J Am Geriatr Soc 2005; 53: 695-9.
22. Freitas S, Simões MR, Alves L, Santana I. Montreal cognitive assessment: validation study for mild cognitive impairment and Alzheimer disease. Alzheimer Dis Assoc Disord 2013; 27: 37-43.
23. Sheikh JI, Yesavage JA. Geriatric Depression Scale (GDS): recent evidence and development of a shorter version. Clin Gerontol 1986; 5: 165-73.
24. Apóstolo JL, Loureiro LMJ, Carvalho IA, Alves I, Batista DF, Sfetcu R. Contribution to the adaptation of the Geriatric Depression Scale-15 into Portuguese. Revista de Enfermagem Referência 2014; 4: 65-73.
25. Mahoney FI, Barthel DW. Functional evaluation: the Barthel Index. Md State Med J 1965; 14: 61-5.
26. Araújo F, Pais-Ribeiro J, Oliveira A, Pinto C. Validação do índice de Barthel numa amostra de idosos não institucionalizados. Revista Portuguesa de Saúde Pública 2007; 25: 59-66.
27. Apóstolo JL, Cardoso D. Operacionalização do programa de estimulação cognitiva em idosos 'Fazer a diferença'. Coimbra: Escola Superior de Enfermagen de Coimbra; 2012. URL: https://www.esenfc.pt/v02/include/download.php?id_ficheiro=18954&codigo=870758549. [09.07.2018].
28. Spector A, Thorgrimsen L, Woods B, Orrell M. Making a difference: an evidence-based group programme to offer cognitive stimulation therapy (CST) to people with dementia. Wimbledon, UK: Hawker Publications; 2006.
29. Cohen J. Statistical power analysis for the behavioral sciences. 2 ed. Hillsdale, NJ: Lawrence Erlbaum; 1988.
30. Chapman SB, Weiner MF, Rackley A, Hynan LS, Zientz J. Effects of cognitive-communication stimulation for Alzheimer's disease patients treated with donepezil. J Speech Lang Hear Res 2004; 47: 1149-63.
31. McGee JS, Bratkovich KL. Assessment and cognitive-behaviorally oriented interventions for older adults with dementia. In Sorocco KH, Lauderdale S, eds. Cognitive behaviour therapy with older adults. Innovations across care settings. New York: Springer Publishing; 2011. p. 219-61.
32. Burke DM, Shafto MA. Language and aging. In Craik FIM, Salthouse TA, eds. The handbook of aging and cognition. Hillsdale, NJ: Lawrence Erlbaum; 2008. p. 373-443.
33. Mapelli D, Di Rosa E, Nocita R, Sava D. Cognitive stimulation in patients with dementia: randomized controlled trial. Dement Geriatr Cogn Dis 2013; 3: 263-71.
34. Orrell M, Aguirre E, Spector A, Hoare Z, Woods RT, Streater A, et al. Maintenance cognitive stimulation therapy for dementia: single-blind, multicenter, pragmatic randomized controlled trial. Br J Psychiatry 2014; 204: 454-61.
35. Zanetti O, Frisoni GB, De Leo D, Dello Buono M, Bianchetti A, Trabucchi M. Reality orientation therapy in Alzheimer's disease: useful or not? A controlled study. Alzheimer Dis Assoc Disord 1995; 9: 132-8.

Programa de estimulación cognitiva individual de larga duración para personas con trastorno neurocognitivo leve: estudio piloto

Introducción. Existen evidencias que sugieren que la estimulación cognitiva produce beneficios cognitivos en personas con trastorno neurocognitivo leve. Sin embargo, el tamaño del efecto encontrado es de pequeño a moderado, y se desconoce el efecto de las intervenciones individuales de larga duración y, más concretamente, sobre dominios cognitivos específicos.

Objetivo. Evaluar la eficacia, viabilidad y aceptabilidad de una intervención de estimulación cognitiva individual de larga duración para personas con trastorno neurocognitivo leve.

Pacientes y métodos. Un total de 30 personas con trastorno neurocognitivo leve fueron asignadas a un grupo de intervención de estimulación cognitiva (n = 15) o a un grupo control (n = 15). La intervención consistió en 88 sesiones individuales de unos 45 minutos, con una periodicidad de dos veces por semana. Evaluadores independientes valoraron el nivel de rendimiento cognitivo, los síntomas depresivos y el nivel de autonomía en la realización de actividades básicas de la vida diaria.

Resultados. Tras la intervención, se encontró una mejoría significativa en el grupo de intervención en comparación con el grupo control en el rendimiento cognitivo global (d = 0,83), concretamente en el dominio del lenguaje (d hasta 1,50), y una menor sintomatología depresiva en el grupo de intervención en comparación con el control (d = 0,93). Sólo un 6,7% de los participantes abandonó el estudio, asistiendo a un promedio de 83 ± 12,1 sesiones.

Conclusiones. Los resultados apoyan la eficacia, viabilidad y aceptabilidad de la intervención, y justifican la realización de un ensayo controlado aleatorizado aplicado a una muestra mayor.

Palabras clave. Anciano. Deterioro cognitivo leve. Estimulación cognitiva. Intervención individual. Terapia no farmacológica. Trastorno neurocognitivo leve.