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Research Article

Effectiveness of Cognitive Stimulation Therapy in Argentina for Older Adults with Mild Cognitive Impairment and Mild Dementia

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Abstract

Background and Aim: Pharmacological treatments for dementia can be limited in terms of availability, eligibility and costs. This has led us to more recent development and use of non-pharmacological interventions. Cognitive Stimulation Therapy (CST) [1] is a group treatment for mild to moderate dementia, with global efficacy in cognition and quality of life. This study aimed to culturally adapt and evaluate CST in an Argentinian context.

Methods: Prospective pre-and post-treatment study design. Forty-one patients with mild cognitive impairment (MCI) and mild dementia were included. Results were compared with a cohort of 81 patients receiving care at the Memory Clinic, serving as a non-intervention control group. All participants were evaluated a minimum of twice, at the diagnostic consultation and at one-year follow-up. Cognitive performance was assessed using the following tests: the Mini-Mental State Examination (MMSE) by Folstein., *et al*. the Addenbrooke's Cognitive Examination-Revised (ACE-R), and the Frontal Assessment Battery (FAB). Quality of life was assessed using the Quality of Life in Alzheimer's Disease scale (QoL-AD) [2].

Results and Conclusion: The results demonstrated that the treatment group achieved significantly higher scores on the MMSE ($p = .002$) and the ACE-R ($p = .005$) compared to the control group, which exhibited a significant decline in performance. The group receiving treatment also showed a positive and statistically significant impact on quality of life. These findings indicate that groups who received CST improved in both cognitive function and quality of life. Based on our experience, participants expressed a desire to continue with Cognitive Stimulation Therapy after completing the 14-session program. Consequently, future studies will explore the implementation of a maintenance therapy phase.

Keywords: *Cognitive Stimulation Therapy; Efficacy; Mild Cognitive Impairment; Dementia; Cultural Adaptation*

Abbreviations

ACE-R Addenbrooke's Cognitive Examination-Revised; CST: Cognitive Stimulation Therapy; FAB: Frontal Assessment Battery; MC: Memory Clinic; MCI: Mild Cognitive Impairment; MMSE: Mini-Mental State Examination; QoL-AD: Quality of Life in Alzheimer's Disease Scale

Introduction

The prevalence of dementia in Latin America is similar to that reported in developed countries. However, a higher frequency has been reported in relatively younger individuals compared to developed nations [3]. Furthermore, diagnostic limitations exist due to sociocultural variables, such as low educational attainment and illiteracy, which influence dementia diagnosis in the region [4]. According to the diagnostic and therapeutic guideline from the Spanish Society of Neurology [5], currently available pharmacological treatments for Alzheimer's disease only succeed in slowing symptom progression. At present, there are no effective disease-modifying drugs to reduce disease severity and restore cognitive function [6]. This situation has created a need to explore new therapeutic strategies. A growing body of evidence indicates that cognitive interventions in individuals with mild cognitive impairment (MCI) and mild dementia produce changes in brain activation patterns. Cognitive stimulation therapy (CST) has been shown to improve cognitive functioning in people with dementia, potentially by enhancing cognitive reserve and inducing neurobiological changes [7]. The absence of side effects makes them a suitable option for preventive treatment as well. In line with a widely accepted definition of psychosocial interventions, Cognitive Stimulation Therapy (CST) has demonstrated stronger evidence of efficacy than other therapies [8]. It differs from cognitive training, which involves guided practice on a set of standard tasks to improve a specific cognitive function, and from cognitive rehabilitation, a more individualized approach aimed at enhancing performance in daily life to achieve preselected personal goals [9]. Developed in the UK, CST involves participation in a range of group activities and discussions aimed at improving cognitive and social function. The fundamental principles of CST applied in each session focus on opinions rather than facts, through the use of new ideas, thoughts, and associations. They provide guidance to help participants feel self-assured, stimulate cognition via multiple sensory activation, and utilize reminiscence as an aid for the here and now [10]. While CST sessions involve themes that could be included in other psychosocial interventions, the crucial point lies in the stimulating manner in which these themes emerge from participant interaction and are presented in a way adapted to their capabilities [11].

CST has been recommended by various health organizations and scientific associations [12] and endorsed by Alzheimer's Disease International. It has been translated and adapted across different cultures, and numerous multicenter studies have expanded the evidence confirming its efficacy in delaying cognitive decline [13]. Furthermore, there is consistent evidence for the cost-effectiveness of CST in UK settings [14].

Our research group has completed the sociocultural adaptation phase of CST [15], which considered the specific linguistic, educational, and sociocultural characteristics of an Argentinian population [16]. Having completed the cultural adaptation of the program, the present study aims to evaluate the efficacy of the intervention and determine its effectiveness by comparing it to a control group in a randomized experimental design. The objective of this study is to determine whether cognitive stimulation therapy (CST), adapted to our population, can improve cognitive performance in patients with mild cognitive impairment and mild dementia. To this end, a randomized clinical trial was designed to evaluate the efficacy of the intervention by comparing the progress of an experimental group with that of a control group, in order to isolate the treatment effect and provide robust evidence on its usefulness in the treatment of the disease.

Materials and Methods

This study included patients diagnosed with mild cognitive impairment (MCI) or mild dementia. Participants were recruited from the Memory Clinic (MC) at the Neurosciences and Complex Systems Unit (ENyS) - an entity affiliated with the National Council for Scientific and Technical Research (CONICET), El Cruce "N. Kirchner" Hospital, and the National University Arturo Jauretche (UNAJ) in Florencio Varela, Buenos Aires province. The research process commenced with the sociocultural adaptation of the CST program for our population.

Patients were selected from CM, an institution dedicated to the comprehensive care of patients presenting subjective memory complaints or referred due to family concerns. All patients admitted to CM undergo a neurological clinical history, which includes personal background, medical history, pharmacological history, laboratory tests, MRI, and a complete neurological examination. Additionally, they are cognitively assessed using a neuropsychological protocol and a socio-environmental questionnaire. All data collected during the evaluation are discussed in weekly multidisciplinary team meetings with the involved professionals to establish a diagnosis. Regarding treatment, patients diagnosed with moderate to severe dementia receive pharmacological treatment; patients diagnosed with mild cognitive impairment and/or mild dementia are monitored annually, and their families are informed to promote understanding and management of symptoms, as well as provided with guidelines for healthy aging.

A pre- and post-treatment design was used. The study population was divided into two groups. The "Treatment" group comprised 41 patients who received CST. The "Control" group consisted of 81 patients who received standard care at the MC; all participants in this group were evaluated a minimum of twice according to the MC protocol: at the initial diagnostic consultation and at the one-year follow-up.

A stratified random sampling method was carried out for participants in the treatment group, who were initially divided into mutually exclusive strata based on variables relevant to the study (mild cognitive impairment vs. mild dementia). For the control group, participants were selected from those who had completed both the baseline assessment at CM and at least one standard follow-up assessment at one year. This process was performed by a neuropsychologist researcher who was not involved in the administration of the treatment or in the assessments. For the allocation, an Excel database was used, applying filters based on the participants' diagnosis to ensure a balanced distribution between the experimental and control groups. To maintain the internal validity of the study and reduce the risk of bias, the researchers responsible for administering the intervention were different from the researcher responsible for conducting the pre- and post-intervention cognitive assessments.

Variable	Treatment Group (n = 41)	Control Group (n = 81)	P value
Gender			0,38[1]
Female	26	63	
Male	15	18	
Age (years) Mean (SD)	73,61 (7,12)	71,60 (6,27)	0,12[2]
Education (years) Mean (SD)	7,15 (3,11)	5,91 (3,19)	0,04[2]
Diagnosis			0,42[1]
Mild Cognitive Impairment	21	33	
Mild Dementia	20	48	

Table 1: *Demographic and clinical characteristics of the study population.*

[1]*Chi-square test.*

[2]*Student's t-test.*

Inclusion criteria: Patients in the Treatment group were randomly selected to receive CST. They included men and women aged over 60 years, without significant auditory, visual, or communication difficulties, and with an average educational attainment of 6.91 to 7.12 years. All patients had sought consultation due to subjective memory complaints and were assessed using the MC protocol (2015). Patients were excluded if there were any modifications to their pharmacological treatment during the study period.

For this study, we selected three of the cognitive tests used in the MC protocol: the Mini-Mental State Examination (MMSE) by Folstein., *et al*. the Addenbrooke's Cognitive Examination-Revised (ACE-R), and the Frontal Assessment Battery (FAB). The Quality of Life in Alzheimer's Disease scale (QoL-AD) was administered exclusively to the Treatment group. The QoL-AD consists of 13 items covering the domains of physical health, energy, mood, living situation, memory, family, marriage, friends, household chores, fun, money, self, and life as a whole [17].

CST was administered following our previous experience in sociocultural adaptation. Sessions were held once a week in the physical space of the MC, lasting two hours each, over a period of fourteen weeks. Following the adapted CST manual, patients in each session exercised executive functions, language, spatial and temporal orientation, communication, and socialization through participatory and playful methodologies designed to promote members' expression of opinions.

During the final session (session 14), a structured closing and evaluation activity was implemented. Each participant shared their perception of the therapy's usefulness, identifying positively valued aspects and proposing suggestions for improvement. Subsequently, the facilitating professionals provided group feedback aimed at synthesizing the learning outcomes and reinforcing the achievements of the process.

The professionals who coordinated the CST groups did not participate in the post-CST evaluations to avoid potential bias in the scoring of the scales.

Statistical analysis: To evaluate the efficacy of the intervention, pre- and post-treatment scores were compared within both groups using a paired Student's t-test. The clinical relevance of the observed changes was quantified by calculating the effect size, reported as Cohen's *d* (Cohen, 1988). Furthermore, to contextualize the magnitude of change in the Treatment group, the Delta (Δ) statistic was estimated, using the scores from the second evaluation of the Control group as the reference for comparison. The analysis was restricted to the statistical methods described, in accordance with the variables considered in this study

Results and Discussion

A total of 122 patients participated in the study: the treatment group (n = 41) and the control group (n = 81). The groups were comparable in terms of age, sex, and clinical diagnosis. Fifty subjects were initially invited to participate in the treatment group, of which 41 completed the CST program. Ten percent declined the invitation, citing transportation difficulties. A minority (20%) who dropped out did so after the first session; the most frequently reported reasons for discontinuation were discomfort in a group setting, followed by concurrent illnesses.

Changes were assessed from pre- to post-intervention in the Treatment group, and between the first and second evaluations in the Control group. As shown in table 2, for the ACE-R, the Treatment group showed a significant improvement from pre- to post-test scores ($p = .005$). In contrast, the Control group showed no significant change ($p = .37$).

On the MMSE, a significant increase in scores was observed in the treatment group ($p = .002$), while the Control group showed no significant differences ($p = .36$). On the FAB, the treatment group showed a trend towards improvement, though it did not reach statistical significance ($p = .10$), whereas the Control group experienced no change ($p = .52$).

Test	Group	Δ-pre	Sd pre	Δ-post	Sd post	T (paired)	P (paired)	Cohen´s d
ACE-R	Treatment	68.56	10.73	72.56	11.47	2.956	0.0052	0.462
	Control	69.9	13.29	68.84	14.62	-0.898	0.3721	-0.1
MMSE	Treatment	24.32	3.97	25.73	3.26	3.297	0.0021	0.515
	Control	25.27	3.96	24.9	4.21	-0.929	0.3559	-0.103
FAB	Treatment	11.54	3.56	12.27	3.1	1.651	0.1065	0.258
	Control	10.27	3.62	10.48	3.28	0.642	0.523	0.071

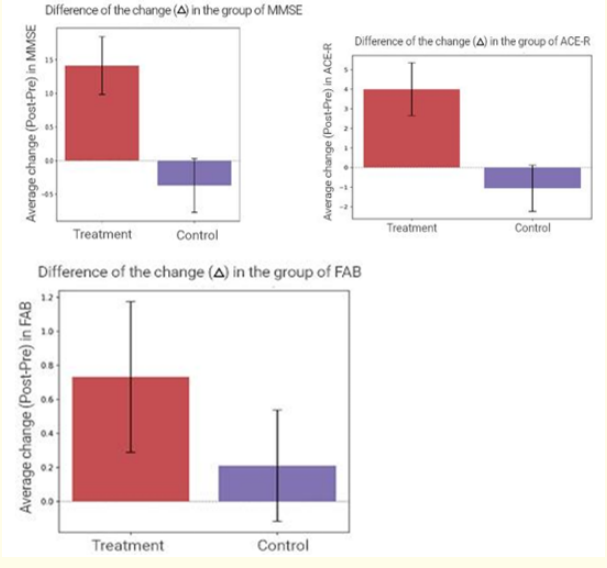
Table 2: *Pre and post treatment and control group.*

Table 3 presents a pre- and post-treatment comparison of quality-of-life assessment using the QoL-AD. It shows a statistically significant improvement in the treatment group following the intervention. Analysis of pre- and post-treatment scores using a paired t-test revealed a significant increase (gl = 19, p = .025), indicating a better subjective perception of quality of life among participants, with notable improvements in the friends and life as a whole items.

QoL-Ad pre and post TEC				
	Media	ds	gl	p
Q1-	36,40	6,840		
Q2	38,90	5,057		
Q1-Q2	-2,500	4,605	19	,025

Table 3: *Treatment group.*

Figure 1 and 2 illustrates the mean change (Δ Post-Pre) for both groups, treatment versus Control, differentiated by neuropsychological test. The following between-group differences were found: for the ACE-R, the difference between groups was significant (p = .0059), indicating a greater improvement in the treatment group. For the MMSE, the between-group comparison was significant (p = .0029), confirming an improvement in the treatment group. For the FAB, the comparison of changes between groups was not statistically significant (p = .35) (Figure 3).



Figure

Conclusion

In our patient population receiving Cognitive Stimulation Therapy (CST), we found significant improvements in various factors, reflected in global cognitive status as measured by the ACE-R and MMSE. While we observed an improvement in frontal functions (FAB), these changes may represent a delay in deterioration rather than improvement and did not reach statistical significance. The enhancements in quality of life (QoL-AD) are consistent with data reported in other studies [18-20]. We did not observe negative or conflictual attitudes among participants with different diagnoses. On the contrary, a supportive and cooperative climate was established, which, over the course of the sessions, solidified into friendships.

Positive trends were noted in communication, including greater fluency, increased interaction between participants, contact outside of sessions, and higher participation levels. The analysis of communication and interaction among participants was strictly qualitative, and these improvements were noted by both professionals and family members. The results showed an improvement in patients who received Cognitive Stimulation Therapy (CST) compared to controls. However, the exclusive causal attribution of this improvement to CST should be approached with caution, given the difficulty of isolating its effect in an outpatient population from the Memory Clinic characterized by low social engagement. This difficulty is consistent with findings from a review of non-pharmacological interventions [21], which describes the evidence as low, although it recommends its implementation.

The positive test results are further reinforced by participants' requests to continue engaging in similar activities.

The MC team is collaborating with the UPAMI workshops at the National University Arturo Jauretche (UNAJ) to provide continuity for social and pedagogical activities while we implement a maintenance program. In a country lacking a national dementia care plan and where public policies for this population are absent, CST can become a useful and accessible tool for other health professionals-such as nurses, therapeutic companions, community health workers, and neighborhood health promoters-to implement within the community. Future research should identify the most effective ways to train healthcare personnel in implementing this program, the potential benefits of a long-term CST program, and the possible effects of combining CST with pharmacotherapy. Based on the results obtained, we have begun offering CST to all patients who meet the inclusion criteria.

It was not possible to control the daily activities of subjects in the treatment group during the intervention period. However, the experience gained from more than ten years of daily practice at the Memory Clinic has enabled us to observe that patients have a limited social life, which would allow us to assume that the observed changes were in response to the therapy. This represents a limitation in controlling external variables that could have functioned as concurrent stimulatory factors.

This study has allowed us to verify that CST, adapted to our local context, was effective as a treatment. Patients showed a significant improvement in global cognitive performance compared to a group that did not receive the therapy. For executive functions, the trend was also toward improvement, albeit without the same level of statistical significance. The participants responded favorably to the tasks carried out over the 14 sessions, associating them with increased social well-being. These results corroborate that CST constitutes a useful, low-cost tool, ideal for our setting.

Conflict of Interest

We declare that there is no financial interest or conflict of interest for this publication.

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