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RESEARCH ARTICLE (ORIGINAL)

Effectiveness of an individual cognitive stimulation program for older adults with cognitive impairment

Efetividade de um programa de estimulação cognitiva individual na pessoa idosa com deterioração cognitiva

Eficacia de un programa individual de estimulación cognitiva para ancianos con deterioro cognitivo

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Abstract
Background: The number of people with dementia increases significantly with age. However, non-pharmacological interventions, such as cognitive stimulation, can slow this process down.
Objective: To evaluate the effectiveness of individual cognitive stimulation interventions on the cognition, quality of life, and neuropsychiatric symptoms of older adults with dementia, as well as on the quality of the relationship between the older adult with dementia and the caregiver.
Methodology: A 12-week quasi-experimental study was conducted. The cognitive stimulation program "Make a Difference 3" was administered to older adults with dementia living in the community. Outcomes of interest were assessed before and after the intervention.
Results: There were statistically significant improvements in neuropsychiatric symptoms (p = 0.042) and cognition (p = 0.038) after the program was administered.
Conclusion: This type of intervention should be widely disseminated and administered as it promotes gains in older adults with cognitive impairment.

Keywords: nursing; dementia; cognitive stimulation; carers; aged; quasi-experimental

Resumo
Enquadramento: O número de pessoas com demência aumenta significativamente com o processo de envelhecimento, contudo, este pode ser retardado através de intervenções não farmacológicas, como a estimulação cognitiva.
Objetivo: Avaliar a efetividade da Estimulação Cognitiva Individual na cognição, qualidade de vida, sintomas neuropsiquiátricos, bem como na qualidade da relação entre a pessoa com demência e cuidador.
Metodologia: Foi realizado um estudo quase-experimental, com a duração de 12 semanas. O programa de estimulação cognitiva, designado "Fazer a Diferença 3", foi implementado a pessoas com demência a residirem na comunidade. A avaliação dos *outcomes* de interesse foi realizada no pré e pós-intervenção.
Resultados: Após a aplicação do programa, verificaram-se melhorias estatisticamente significativas nos sintomas neuropsiquiátricos (p = 0,042) e na cognição (p = 0,038).
Conclusão: Sugere-se a forte disseminação e implementação deste tipo de intervenções, pelos ganhos que promove nas pessoas idosas com deterioração cognitiva.

Palavras-chave: enfermagem; demência; estimulação cognitiva; cuidadores; idoso; quase-experimental

Resumen
Marco contextual: El número de personas con demencia aumenta significativamente con el proceso de envejecimiento, pero este puede ralentizarse mediante intervenciones no farmacológicas, como la estimulación cognitiva.
Objetivo: Evaluar la eficacia de la estimulación cognitiva individual en la cognición, la calidad de vida, los síntomas neuropsiquiátricos y la calidad de la relación entre la persona con demencia y el cuidador.
Metodología: Se llevó a cabo un estudio cuasiexperimental de 12 semanas de duración. El programa de estimulación cognitiva, denominado "Fazer a Diferença 3" se aplicó a personas con demencia que vivían en la comunidad. Los resultados de interés se evaluaron antes y después de la intervención.
Resultados: Tras aplicar el programa, hubo mejoras estadísticamente significativas en los síntomas neuropsiquiátricos (p = 0,042) y en la cognición (p = 0,038).
Conclusión: Se sugiere que este tipo de intervención sea ampliamente difundida e implementada, debido a los beneficios que aporta a las personas mayores con deterioro cognitivo.

Palabras clave: enfermería; demencia; estimulación cognitiva; cuidadores; ancianos; cuasiexperimental

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Introduction

Aging, which is inherent to the life cycle, requires innovative scientific and clinical approaches. The biological changes that occur during the aging process reflect the experiences accumulated and the continuous neuroplasticity of the brain allows for learning and adaptation. Therefore, it is essential to recognize the value of knowledge and emotional and intellectual development at this stage of life (Costa et al., 2023; World Health Organization [WHO], 2021).

However, it is also important to understand that cognitive decline (including dementia) is a challenge for societies and healthcare systems that requires appropriate care interventions to preserve the quality of life and dignity of the persons affected (Costa et al., 2023; WHO, 2021). Thus, each discipline's approaches and intervention strategies must be person-centered and aimed at developing innovative care solutions. The Current National Institute for Health and Care Excellence (NICE) guidelines recommend that people with mild to moderate dementia should be offered interventions based on Cognitive Stimulation (CS) therapy (NICE, 2018; Woods et al., 2012).

Recently, research has begun to explore Individual Cognitive Stimulation (ICS), which is a type of CS therapy delivered on a one-on-one basis by either a professional or a caregiver (Hui et al., 2022; Orgeta et al., 2015; Rai et al., 2020; Silva et al., 2020; Silva, Bobrowicz-Campos, Santos-Costa, Gil, et al., 2021). ICS, like group CS, consists of a variety of activities designed to provide mental stimulation in the areas of thinking, concentration, communication, and several types of memory. Reminiscence, discussions on topics of interest, problem-solving activities, and word and number games are among the activities included in ICS (Apóstolo et al., 2019; Orgeta et al., 2015). The effectiveness of this intervention is supported by the existing evidence that associates ICS programs with health benefits, namely in terms of cognition, mood, well-being, functional activity, quality of life, and communication skills (Orgeta et al., 2015; Silva, Bobrowicz-Campos, Santos-Costa, Cruz et al., 2021; Silva et al., 2022).

The "Making a Difference 3 - An Individual Cognitive Stimulation Program" (MD3) is an example of an ICS program (Apóstolo et al., 2019; Yates et al., 2015).

This study aims to evaluate the effectiveness of MD3, administered over 12 weeks, on the cognition, quality of life, and neuropsychiatric symptoms (including depressive symptoms) of older adults with dementia, as well as on the quality of the relationship between the caregiver and the older adult (dyad).

Background

Today, more than 55 million people worldwide are living with dementia. According to estimates, this number is expected to increase to more than 78 million people with dementia by 2030 and to more than 139 million by 2050 (WHO, 2021). This considerable growth reflects the impact of dementia not only on public health but also on the global socio-economic sphere. In Portugal, dementia is also a major health challenge, with an increasing number of people affected and a significant impact on the healthcare system and families' lives.

Degenerative syndromes can have different etiologies, such as Alzheimer's disease (accounting for about 60% of dementia cases), dementia with Lewy bodies, frontotemporal dementia, and vascular dementia, among others (Livingston et al., 2017; WHO, 2021). The etiology of degenerative syndromes largely determines their development, manifestation, and progression, as well as their response to non-pharmacological interventions (Livingston et al., 2017).

Due to the growing number of people with dementia and the significant public health impact of this syndrome, international guidelines are increasingly recommending non-pharmacological interventions such as ICS (NICE, 2018; Woods et al., 2012). As already mentioned, ICS incorporates a variety of activities such as recalling memories, discussing topics of interest, problem-solving activities, and word and number games to provide mental stimulation in the areas of thinking, concentration, communication, and several types of memory (Apóstolo et al., 2019; Orgeta et al., 2015). Non-pharmacological interventions such as CS/ICS in response to dementia are becoming increasingly relevant due to the growing clinical and socioeconomic impact of this syndrome (WHO, 2021; Livingston et al., 2017; Woods et al., 2012).

MD3 was translated and validated for the Portuguese culture and language and designed to be administered in the home context, where the informal/family caregiver conducts the stimulation sessions (Apóstolo et al., 2019; Silva, Bobrowicz-Campos, Santos-Costa, Gil, et al., 2021). The program is divided into two chapters. The first chapter focuses on the caregiver's needs, anticipating doubts and providing guidance on how to implement the program, as well as the thirteen principles of ICS (Apóstolo et al., 2019; Yates et al., 2015). The second chapter consists of 75 stimulation sessions that focus on different topics, such as life history, current events, and art content, to stimulate the different cognitive domains (Apóstolo et al., 2019; Yates et al., 2015). The implementation of MD3 should be promoted, particularly among those who do not have access to other types of stimuli.

Research questions

What is the effectiveness of the "Making a Difference 3 - Individual Cognitive Stimulation Intervention" program, administered over 12 weeks, on the cognition, quality of life, and neuropsychiatric symptoms (including depressive symptoms) of older adults with dementia? What is the effectiveness of the "Making a Difference 3 - Individual Cognitive Stimulation Intervention" program, administered over 12 weeks, on the quality of the relationship between the caregiver and the older adult (dyad)?

Methodology

This quasi-experimental clinical research study was conducted between January 2022 and December 2022, after obtaining a favorable opinion on ethical procedures from the Ethics Committee of the Nursing School involved in the research (Opinion No. 03/01/2022- AD_P744_12_2020).

A convenience sampling method was used to select study participants. The study population consisted of all people aged 60 years or older (as this age group has a high prevalence of the phenomenon) and their respective caregivers, living at home in a city in central Portugal.

First, possible dyads (older adults with cognitive impairment and their caregivers), referred by different organizations in the city, were identified and their eligibility was assessed. In this assessment, the following inclusion criteria were considered: i) a person aged 60 years or older, with a diagnosis of dementia made by a neurologist or psychiatrist, or who, if validated by the family physician, meets the criteria of the DMS-III/IV/5 or the ICD-9/10; ii) with a score on the Six-Item Cognitive Impairment Test (6CIT; Apóstolo et al, 2018; Brooke & Bullock, 1999) between 2 (indicating a change in more than one of the cognitive domains assessed by the instrument) and 20 (indicating preservation of at least some of the cognitive domains, i.e. absence of severe dementia); iii) without any physical illness or significant disability that prevents participation in the stimulation sessions; iv) able to communicate and understand communication; v) living in the community (at home) and with an informal caregiver, family member, friend, neighbor, or volunteer who is available and able to administer the ICS therapy. Individuals with (i) severe dementia, assessed according to the cut-off point of 21 or more in the 6CIT (Apóstolo et al., 2018; Brooke & Bullock, 1999), and informal caregivers (ii) with a history of severe psychiatric illness or cognitive impairment, even if mild, were excluded from the study.

The dyads were informed of the purpose of the study and their informed consent was obtained. They were also informed of the confidentiality and anonymity of the data obtained throughout the implementation of the program. After the dyads' eligibility was verified, each pair underwent two assessments: i) the first before the intervention, at week zero, called Moment Zero (M0); ii) the second at the end of the intervention, at week 13, called Moment 13 (M13).

The assessments were conducted by members of the research team (a nurse and a psychologist), and by the same person at both times. Sociodemographic data such as age, marital status, and education were collected from all participants, and the following instruments were used at both moments to assess the effectiveness of the intervention: i) Saint Louis University Mental Status Test (SLUMS, Pinto, 2007; Tariq et al., 2006); ii) Quality of Life in Alzheimer's Disease (QoL-AD, Bárrios, 2012; Logsdon et al, 1999); iii) Neuropsychiatric Inventory Questionnaire (NPI-Q, Cummings et al., 1994; Leitão et al., 2008); iv) Geriatric Depression Scale - 15 (GDS-15, Apóstolo, 2011; Yesavage & Sheikh, 1986); v) and the Quality of the Carer-Patient Relationship Scale (QCPR; Silva, Bobrowicz-Campos, Santos-Costa, Gil, Neves et al., 2021; Spruytte, 2012). The QCPR and the QoL-AD scales (Bárrios, 2012; Logsdon et al., 1999) allowed for understanding the perspective of each element of the dyad separately.

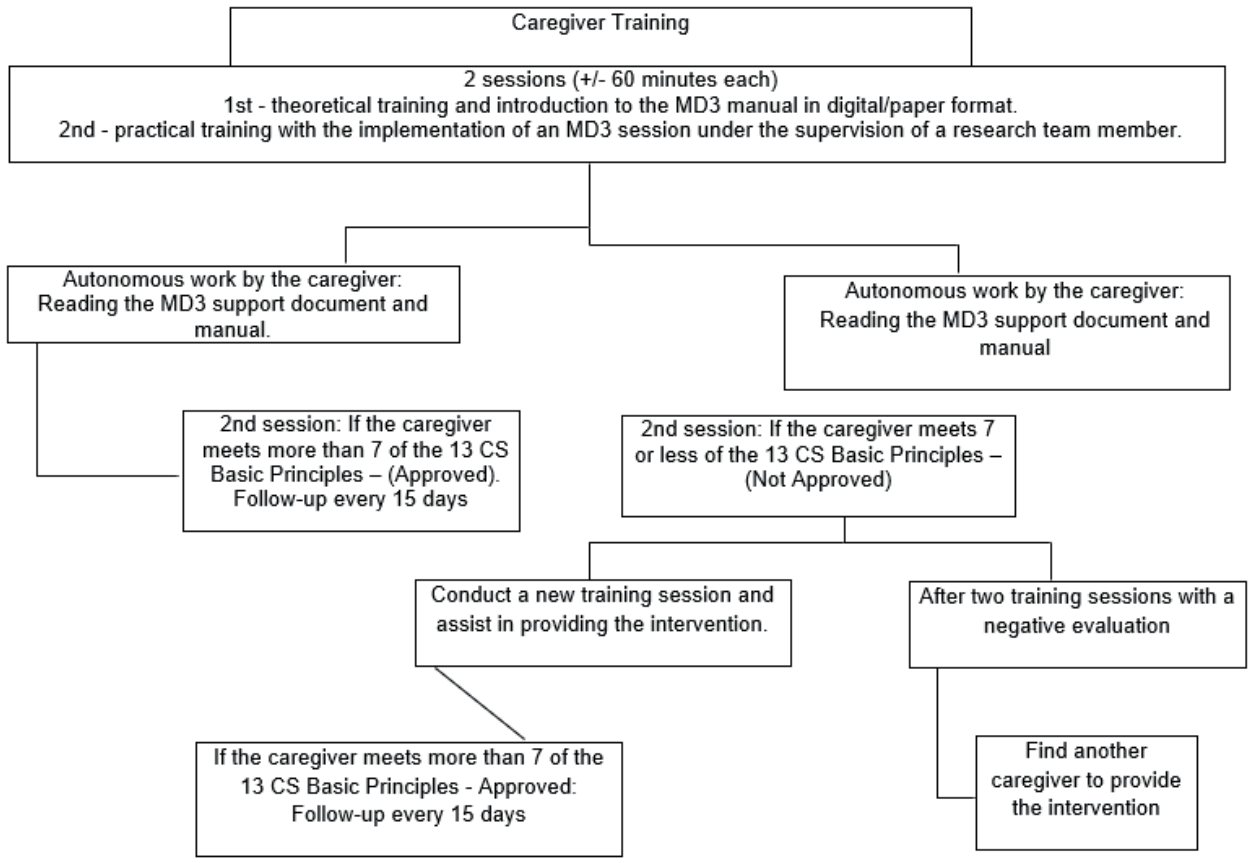
Data were analyzed using IBM SPSS Statistics software, version 24.0. The analysis also included the Wilcoxon Signed-Rank test, which was used to compare the scores on the different scales used, such as the SLUMS and the NPI-Q, and Pearson's correlation coefficient, which was used to assess the relationship between continuous variables, specifically between depressive symptomatology and the quality of life of older adults from the caregivers' perspective. Statistically significant results were considered at a significance level of $p < 0.05$.

The participants received ICS therapy using the MD3 program for 12 weeks, with three sessions per week for a total of 36 sessions. The interventions were administered by the caregiver (a family member, friend, neighbor, or volunteer) to the older adult with mild to moderate dementia. The members of the implementation team (nurses, psychologists, gerontologists, and social workers) trained the caregivers (caregiver training) before the intervention began and provided guidance/supervision during the development of the program. This supervision was conducted by the implementation team through weekly telephone calls and bi-weekly in-person meetings. To ensure the internal validity and consistency of the evaluations, the team received prior training, used standardized manuals, and held monthly meetings to align procedures and strategies. In addition, standardized protocols were established for intervention and evaluation, both in person and by telephone.

The caregiver training process is illustrated in Figure 1.

Figure 1

Caregiver training flowchart



Results

In the initial phase, 42 dyads were selected, but only 21 completed the program (21 older adults with cognitive impairment and 21 caregivers/volunteers). Therefore, 21 dyads dropped out during the study, resulting in an attrition rate of 50%. The main reasons for dropping out of the study were excessive work stress, unavailability of the informal caregiver's schedule, demotivation of both dyad members, and the older adult's refusal at the end of the first few weeks. The older adults with cognitive impairment had a mean age of 81.3 years, and 33.3% (n = 7) were male and 66.7% (n = 14) were female. In terms of education, approximately 71.4% (n = 15) had completed the first cycle of basic education (year 4). The caregivers had a mean age of 51.3 years, were predominantly female, and most had completed upper secondary and higher education. Most caregivers had a daughter/son relationship with the older adults. Approximately 57% of the dyads (n = 12) did not live together, and 61.9% (n = 13) of the caregivers reported that they were not the older adult's primary caregiver. However, when the caregiver in the dyad was the older adult's primary caregiver, it was possible to verify that they provided approximately 10.4 hours of care to the older adult, with this number varying between 6 and 15 hours (standard deviation of 2.5). Table 1 shows the sociodemographic data of the sample.

Table 1

Sociodemographic characterization of the study dyads

Element of the dyad	Variable	Characterization (*N* = 21)
Older adult	**Age (years)**	81.3 (73-90; ± 4.8)
	Sex	
	Male	7 (33.3%)
	Female	14 (66.7%)
	Education	
	Illiterate	3 (14.3%)
	Basic Education – 1st cycle (Year 4)	15 (71.4%)
	Basic Education – 2nd cycle (Year 6)	1 (4.8%)
	Higher Education	2 (9.5%)
Caregiver	**Age (years)**	51.3 (27-74; ± 14.1)
	Sex	
	Male	4 (19%)
	Female	17 (81%)
	Education	
	Basic Education – 1st cycle (Year 4)	4 (19%)
	Basic Education – 2nd cycle (Year 6)	1 (4.8%)
	Basic Education – 3rd cycle (Year 9)	3 (14.3%)
	Upper Secondary Education (Year 12)	6 (28.6%)
	Vocational Education and Training	1 (4.8%)
	Higher Education	6 (28.6%)
	Type of relationship with the older adult	
	Child	12 (57.1%)
	Spouse	3 (14.3%)
	Grandchild	2 (9.5%)
	Formal caregiver	1 (4.8%)
	Volunteer	3 (14.3%)

The 6CIT (Apóstolo et al., 2018; Brooke & Bullock, 1999) was used to screen older adults' cognition, resulting in a mean score of 15.2 points (6-20; ± 6.2). Approximately 19% of the older adults (n = 4) had scores below 10 points. Regarding the results obtained after the implementation of the program, statistically significant improvements were observed in neuropsychiatric symptoms (p = 0.042) measured by the NPI-Q (Cummings et al., 1994; Leitão et al., 2008) and in the cognitive component (p = 0.038) assessed by the SLUMS (Pinto, 2007; Tariq et al., 2006). There were no significant improvements in the other parameters assessed. Table 2 shows the effectiveness of the intervention on cognition, depressive and/or neuropsychiatric symptoms, as well as on the quality of life of the older adult with dementia and the quality of the relationship between caregiver and older adult.

Table 2

Assessment of the effectiveness of the intervention in the outcomes identified for older adults and/or caregivers.

Scale	Outcomes observed by phase (mean)	Wilcoxon Signed-Rank Test	*p*
SLUMS Initial assessment Final assessment	 12.9 (3-21; 4.9) 14.8 (2-26; 5.8)	*z* = -2.079	0.038
QOL-AD (older adult) Initial assessment Final assessment	 30.7 (20-38; ±4.6) 30.9 (22-42; ±5.2)	*z* = - 0.041	0.968
QOL-AD (caregiver) Initial assessment Final assessment	 29.6 (17-42; ±6.8) 29.8 (17-39; ±5.4)	*z* = - 0.403	0.687
NPI-Q Initial assessment Final assessment	 4.9 (0-24; 6.5) 2.4 (0-14; 4.0)	*z* = -2.031	0.042
GDS-15 Initial assessment Final assessment	 5.7 (1-10; 2.8) 4.8 (1-13; 3.0)	*z* = -1.645	0.100
QCPR (caregiver) Initial assessment Final assessment	 5.0 (42-67; 6.8) 55.6 (43-67; 7.4)	*z* = -1.177	0.239
QCPR (older adult) Initial assessment Final assessment	58.6 (53-66; 4.0) 57.8 (44-68; 6.5)	*z* = - 0.748	0.454

Note. GDS-15 = Geriatric Depression Scale - 15; QCPR = Quality of the Carer-Patient Relationship Scale; QoL-AD = Quality of Life in Alzheimer's Disease; SLUMS = Saint Louis University Mental Status Test; NPI–Q = Neuropsychiatric Inventory Questionnaire.

The NPI-Q (Cummings et al., 1994; Leitão et al., 2008) found that about 38% of older adults (n = 8) showed improvements in anxiety and depression symptoms, and about 28.5% (n = 6) in apathy symptoms. The SLUMS (Pinto, 2007; Tariq et al., 2006) showed that 52.4% of the older adults (n = 11) improved in the episodic memory category, 42.8% (n = 9) in visual coordination and motor dexterity, 33.3% (n = 7) in the short-term memory component, and 24% (n = 5) in the numerical reasoning, attention, and concentration component. Pearson's correlation coefficient revealed a strong negative correlation between the depressive symptoms experienced by the older adults after the MD3 intervention and the quality of life of the older adults with dementia as perceived by their caregivers (r = - 0.517; p = 0.016).

Discussion

This study obtained positive and promising results after implementing MD3 (Apóstolo et al., 2019; Yates et al., 2015), finding statistically significant improvements in neuropsychiatric symptoms and the cognitive component. The MD3 program intervention is innovative and presented in a simple format accessible to caregivers (Apóstolo et al., 2019; Orgeta et al., 2015). Furthermore, recent studies have demonstrated the broad therapeutic potential of MD3, as it can be combined with new information and communication technologies (ICT) and implemented in other care settings (e.g., with institutionalized older adults) and with other types of facilitators (e.g., formal caregivers and health professionals; Ali et al, 2022; Hui et al., 2022; Hui et al., 2022; Rai et al., 2020; Silva et al., 2020; Silva, Bobrowicz-Campos, Santos-Costa, Gil et al., 2021). The present study stands out in the sense that it included volunteers in the occasional situation where the older adult with dementia did not have a family caregiver available to administer the intervention three times a week. This allowed for a reduction in existing attrition. As suggested by Yates et al. (2015), the caregiver implementing this intervention can share this task with another significant person, such as a friend, neighbor, or in the case of this study, a volunteer from the municipality.

Studies conducted with this program have also confirmed that the supervision of health professionals throughout the process is essential for the dyad's adherence to the intervention and the success of the program. The health professionals involved in this study ensured this supervision as a strategy to guarantee the effectiveness of the intervention and reduce the attrition rate throughout the implementation period (Silva et al., 2020; Silva, Bobrowicz-Campos, Santos-Costa, Cruz, et al., 2021).

Like traditional CS, ICS provides health benefits to older adults with cognitive impairment (Orgeta et al. 2015; Silva et al., 2020; Silva, Bobrowicz-Campos, Santos-Costa, Cruz et al., 2021; Woods et al., 2012). Silva et al.'s (2020) systematic review observed several cognitive benefits through experimental studies, including memory, verbal fluency, attention, and problem-solving, as well as improvements in the performance of activities of daily

living. It also observed improvements in symptoms of both anxiety and depression, as well as a decrease in symptoms related to apathy. Cognitively, there were gains in memory (episodic and short-term), visual coordination, and motor dexterity, and some participants showed improvements in numerical reasoning, attention, and concentration. However, it is worth noting that some of the magnitude of the results may be due to the state of understimulation (Livingston et al., 2017) that some of the participants experienced as a result of the post-pandemic context in which the study took place. In this sense, the intervention may have made a difference in their lives. These benefits are highly significant when considering that neuropsychiatric symptoms are a major burden for families and, consequently, one of the biggest reasons for institutionalizing people with dementia (Livingston et al., 2017). Therefore, this type of intervention, which has a low cost to healthcare services, should be disseminated among families and formal caregivers who are willing to implement it (Orgeta et al., 2015; Yates et al. 2015). In a society that is increasingly aging, the possibility of aging at home and in the community is a measure that promotes higher levels of autonomy, well-being, happiness, and quality of life (Costa et al., 20-23; Livingston et al., 2017). Training caregivers for their role is a necessary strategy, and MD3 looks promising in this regard. Orgeta et al. (2015) evaluated the emotional and physical impact of implementing MD3 on caregivers and found that the results were favorable to the intervention. In other words, the implementation of the ICS sessions did not prove to be a burden for caregivers and, on the contrary, may even improve the quality of the dyadic relationship (Orgeta et al., 2015). In the present study, the quality of the relationship improved slightly, although it did not show statistical significance. This finding was similar to another study conducted in a Portuguese context with the same program (Silva, Bobrowicz-Campos, Santos-Costa, Cruz et al., 2021). Future studies with larger samples and longer intervention periods may provide more conclusive evidence.

Another aspect to consider as a result of this study is the association between a reduction in depressive symptoms and an increase in the caregiver's perception of the quality of life of the person with dementia. Although depressive symptoms, as assessed by the GDS-15 (Apóstolo, 2011; Yesavage & Sheikh, 1986), decreased slightly after the intervention, this difference was not statistically significant. Nevertheless, it may have been sufficient for caregivers to consider that the quality of life of the person with dementia improved in the cases where improvements in depressive symptoms were observed.

The study has limitations that should be considered when interpreting the results. These limitations include the small sample size, which may reduce statistical power, the high dropout rate, the lack of a control group, and the lack of control over other variables that may have influenced the results, among others due to the home environment where the interventions took place, despite the team's supervisory measures to reduce them.

Conclusion

The implementation of ICS sessions led to improvements in cognition and neuropsychiatric symptoms. This study obtained promising results and provided evidence to recommend the administration of this type of cognitive intervention in the early and moderate stages of dementia. It also adds to the existing body of evidence on the effectiveness of the intervention and is the first to be conducted at a national level in the post-pandemic period. However, there is the possibility that the majority of older adults were understimulated due to increased social isolation and that the gains observed were largely due to the social stimulation provided by the dyads.

The implementation of this type of intervention in practice is recommended, as it translates into significant improvements in the lives of older adults with dementia, particularly regarding symptoms of depression and anxiety and cognitive levels, such as improved memory, attention, visual coordination, and motor dexterity, thus promoting older adults' autonomy and enhancing the functionality of the caregiver/older adult dyad. Suggestions for future research include the creation of a team of multidisciplinary professionals and volunteers to closely supervise the dyads and assist in the administration of the stimulation sessions, in order to increase the effectiveness of the program and reduce attrition. The development of longer studies with larger samples is also suggested, as well as the definition of referral criteria so that health professionals can quickly identify which dyads can benefit from the prescription of this intervention.

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References

Ali, A., Brown, E., Tsang, W., Spector, A., Aguirre, E., Hoare, S., & Hassiotis, A. (2022). Individual cognitive stimulation therapy (iCST) for people with intellectual disability and dementia: a feasibility randomized controlled trial. *Aging & mental health, 26*(4), 698–708. https://doi.org/10.1080/13607863.2020.1869180

Apóstolo, J. (2011). Adaptation into European Portuguese of the geriatric depression scale (GDS-15). *Revista de Enfermagem Referência - Suplemento Actas e Comunicações XI Conferência Iberoamericana de Educação em Enfermagem*, II (3-4 Supl.), 452-452.

Apóstolo, J., Paiva, D., Silva, R., Santos, E., & Schultz, T. (2018). Adaptation and validation into Portuguese language of the six-item cognitive impairment test (6CIT). *Aging & Mental Health, 22*(9), 1190-1195. https://doi.org/10.1080/13607863.2017.1348473

Apóstolo, J., Silva, R., Bobrowicz-Campos, E., & Costa, P. (2019). *Fazer a diferença 3 - Terapia de Estimulação Cognitiva Individual. Um manual para cuidadores.* Escola Superior de Enfermagem de Coimbra.

Bárrios H. (2012). Adaptação Cultural e Linguística e Validação do Instrumento QOL-AD para Portugal. Master's thesis in Palliative Care. Universidade de Lisboa, Portugal.

Brooke, P., & Bullock, R. (1999). Validation of a 6-item cognitive impairment test with a view to primary care usage. *International Journal of Geriatric Psychiatry, 14*(11), 936-940. https://doi.org/10.1002/(SICI)1099-1166(199911)14:11<936:AID-GPS39>3.0.CO;2-1

Costa, A., Henriques, J., Alarcão, V., Henriques, A., Madeira, T., Virgolino, A., Sousa, J., Feteira-Santos, R., Arriaga, M., Rocha, J., & Nogueira, P. (2023). Active aging awareness and well-being among older adults in Portugal. *Frontiers in public health, 11,* 1149731. https://doi.org/10.3389/fpubh.2023.1149731

Cummings, J., Mega, M., K, G., Rosenberg-Thompson, S., Carusi, D., & Gornbein, J. (1994). The Neuropsychiatric Inventory. *Neurology, 44,* 2308-2314. https://doi.org/10.1212/WNL.44.12.2308

Hui, E. K., Wong, G. H. Y., Tischler, V., Yuan, S. N. V., Leung, W. G., Saunders, R., Suen, L. W., & Spector, A. (2022). Virtual individual cognitive stimulation therapy in Hong Kong: A mixed methods feasibility study. *Geriatric nursing (New York, N.Y.), 47,* 125–134. https://doi.org/10.1016/j.gerinurse.2022.07.010

Leitão, O., & Nina, A. (2008). Inventário Neuropsiquiátrico – versão portuguesa. In A. Mendonça & M. Guerreiro (Eds.), *Grupos de Estudos de Envelhecimento Cerebral e Demência* (págs. 33–49).Livingston, G., Sommerlad, A., Orgeta, V., Costafreda, S. G., Huntley, J., Ames, D., Ballard, C., Banerjee, S., Burns, A., Cohen-Mansfield, J., Cooper, C., Fox, N., Gitlin, L. N., Howard, R., Kales, H. C., Larson, E. B., Ritchie, K., Rockwood, K., Sampson, E. L., Samus, Q., … Mukadam, N. (2017). Dementia prevention, intervention, and care. *Lancet (London, England)*, *390*(10113), 2673–2734. https://doi.org/10.1016/S0140-6736(17)31363-6

Logsdon, R., Gibbons, L., McCurry, S., & Teri, L. (1999). Quality of Life in Alzheimer's Disease: Patient and Caregiver Reports. *Journal of Mental Health and Aging, 5*(1), 21-32. https://psycnet.apa.org/record/1999-05045-003

National Institute for Health and Care Excellence (2018). *Dementia Assessment, management and support for people living with dementia and their carers.* https://www.nice.org.uk/guidance/ng97

Orgeta, V., Leung, P., Yates, L., Kang, S., Hoare, Z., Henderson, C., Whitaker, C., Burns, A., Knapp, M., Leroi, I., Moniz-Cook, E. D., Pearson, S., Simpson, S., Spector, A., Roberts, S., Russell, I. T., de Waal, H., Woods, R. T., & Orrell, M. (2015). Individual cognitive stimulation therapy for dementia: a clinical effectiveness and cost-effectiveness pragmatic, multicentre, randomised controlled trial. *Health technology assessment (Winchester, England), 19*(64), 1–108. https://doi.org/10.3310/hta19640

Pinto, A. (2007). O teste SLUMS: Apresentação, tradução e normas de cotação. *Psicologia, Educação Cultura, 11*(2), 393-403. https://www.fpce.up.pt/docentes/acpinto/artigos/27_amancio.pdf

Rai, H., Schneider, J., & Orrell, M. (2020). An Individual Cognitive Stimulation Therapy App for People with Dementia: Development and Usability Study of Thinkability. *JMIR aging, 3*(2), e17105. https://doi.org/10.2196/17105

Silva, R. C., Bobrowicz-Campos, E. M., Santos-Costa, P. J., Gil, I. M., Almeida, M. L., & Apóstolo, J. L. (2021). Making a Difference 3 – an individual cognitive stimulation program for older people: Appropriateness and feasibility. I, 5(8), e20161. https://doi.org/10.12707/RV20161

Silva, R., Bobrowicz-Campos, E., Cardoso, D., Costa, P., Couto, F., Camarneiro, A. P., Abrunheiro, S., Almeida, M., & Apóstolo, J. (2020). Effects of caregiver-provided individual cognitive interventions on cognition, social functioning and quality of life in older adults with major neurocognitive disorders: a systematic review. *JBI evidence synthesis, 18*(4), 743–806. https://doi.org/10.11124/JBISRIR-D-19-00125

Silva, R., Bobrowicz-Campos, E., Santos-Costa, P., Cruz, A. R., & Apóstolo, J. (2021). A Home-Based Individual Cognitive Stimulation Program for Older Adults with Cognitive Impairment: A Randomized Controlled Trial. *Frontiers in psychology, 12,* 741955. https://doi.org/10.3389/fpsyg.2021.741955

Silva, R., Bobrowicz-Campos, E., Santos-Costa, P., Gil, I., Neves, H., & Apóstolo, J. (2021). The Quality of Carer-Patient Relationship Scale: Adaptation and Validation into Portuguese. *International journal of environmental research and public health, 18*(3), 1264. https://doi.org/10.3390/ijerph18031264

Spruytte, N., Van Audenhove, C., Lammertyn, F., & Storms, G. (2002). The quality of the caregiving relationship in informal care for older adults with dementia and chronic psychiatric patients. *Psychology and psychotherapy*, *75*(Pt 3), 295–311. https://doi.org/10.1348/14760830232036520 8Tariq, S. H., Tumosa, N., Chibnall, J. T., Perry, M. H., 3rd, & Morley, J. E. (2006). Comparison of the Saint Louis University mental status examination and the mini-mental state examination for detecting dementia and mild neurocognitive disorder- a pilot study. The American journal of geriatric psychiatry: official journal of the American *Association for Geriatric Psychiatry, 14*(11), 900-910. https://doi.org/10.1097/01.JGP.0000221510.33817.86

Woods, B., Aguirre, E., Spector, A. E., & Orrell, M. (2012). Cognitive stimulation to improve cognitive functioning in people with dementia. *The Cochrane database of systematic reviews*, (2), CD005562. https://doi.org/10.1002/14651858.CD005562.pub2

World Health Organization. (2021). *Global status report on the public health response to dementia.* https://www.who.int/publications/i/item/9789240033245

Yates, L., Orrel, M., Phoung, L., Spector, O., Woods, B., & Orgeta, V. (2015). *Making a Difference 3 - Individual Cognitive Stimulation Therapy: A manual for carers.* The Journal of Dementia Care: Hawker Publications.

Yesavage, J., & Sheikh, J. (1986). Geriatric Depression Scale (GDS). *Clinical Gerontologist, 5*(1-2), 165-173. https://doi.org/10.1300/J018v05n01_09