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Non-pharmacological interventions and quality of life of people with Alzheimer's disease

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Resumo – *A doença de Alzheimer (DA) tem um impacto físico, psicológico e socioeconómico, reduzindo a qualidade de vida (QV) das pessoas. Embora, na demência, a QV não diminua necessariamente com a progressão da doença, na ausência de cura, as pessoas com DA (PCDA) necessitam de tratamento, cuidados e apoio baseados em evidências para retardar a progressão da doença e melhorar, ou pelo menos manter, a QV relacionada com a saúde. O objetivo deste estudo foi avaliar o impacto da intervenção não farmacológica (INF) na QV de PCDA. Foram incluídas uma amostra de quarenta doentes submetidos a INF e outra de quarenta doentes do "grupo control" (GC). Os dados recolhidos incluíram informações sociodemográficas, clínicas, cognitivas, funcionais e QV. O grupo que recebeu INF obteve melhores resultados do que o GC na segunda avaliação, nas pontuações dos testes de avaliação funcional, cognitiva e de QV. Os resultados obtidos na avaliação da QV com o QOL-AD nos dois momentos de avaliação e nos dois grupos avaliados, o "grupo de intervenção" (GI) obteve melhores resultados do que o GC na segunda avaliação, o que indica que a INF permite a ocorrência de ganhos em saúde. As médias obtidas em relação aos valores do estado de saúde através da aplicação do instrumento EQ-5D-3L em 80 doentes demonstraram que as pessoas do GI sofreram uma menor deterioração do seu estado de saúde. Este estudo apoia a recomendação de que sejam implementadas intervenções personalizadas para doentes com DA, incluindo INFs que melhorem a QV.*

Abstract – *Alzheimer's disease (AD) has a physical, psychological and socioeconomic impact and reduces people's quality of life (QOL). Although, in dementia, QOL does not necessarily decrease as dementia progresses, in the absence of a cure, people with AD (PWAD) require evidence-based treatment, care and support to slow disease progression and improve or at least maintain health-related QOL. The aim was to conduct a study on the impact of NPI on the QOL of PWAD. A sample of forty patients undergoing non-pharmacological intervention (NPI) and another of forty patients from the "control group" (CG) were included. Data collected included sociodemographic, clinical, cognitive, and functional information, as well as QOL. The group that received NPI obtained better results than the CG in the second assessment regarding scores on functional, cognitive and QOL assessment tests. Regarding the results obtained in the assessment of QOL with the QOL-AD in the two evaluation moments and in the two groups evaluated, the "intervention group" (IG) obtained better results than the CG in the second evaluation, which indicates that the NPI allows the occurrence of health gains. The means obtained regarding the health status values through the application of the EQ-5D-3L instrument in 80 patients demonstrated that people in the IG suffered less deterioration in their health status. This study supports the recommendation that tailored interventions for AD patients be implemented, including NPIs that improve QOL.*

Palavras-chave – *Doença de Alzheimer, Demência, Intervenções não farmacológicas, Estimulação cognitiva, Qualidade de vida*

Keywords – *Alzheimer's disease, Dementia, Non-pharmacological interventions, Cognitive stimulation, Quality of life*

1. Introduction

Alzheimer's disease (AD) is one cause of dementia. Quality of life (QOL) refers to a person's overall well-being and level of satisfaction with life, including different areas such as health, relationships, work and social environment. QOL is defined by the World Health Organization (2025) as "an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns".

In dementia, QOL does not necessarily decline as the disease progresses (Clare et al., 2022; Farina et al., 2020; Hendriks et al., 2021; Hoe et al., 2009; Lyketsos et al., 2003; Missotten et al., 2007; Selwood et al., 2005).

In some cases, QOL can be maintained or even improved, particularly with interventions that address mood and cognitive function. AD continues to be a major focus for research and healthcare, with efforts centered on improving QOL for people with dementia (PWD) and their caregivers.

Research explores various aspects of QOL, including the impact of disease progression, the effectiveness of interventions, and the perspectives of both patients and caregivers. According to Campbell et al. (2025), the significance of QOL data extends beyond clinical insights, playing a crucial role in health economics, policy-making, and decision-making processes.

Improving QOL is a priority goal of care for people living with dementia (Hoben et al., 2024). In the absence of a cure, PWD need evidence-based treatment, care and support to slow disease progression and improve or at least maintain health-related QOL (HRQOL) (Michalowsky et al., 2020; Robinson et al., 2015). Non-pharmacological interventions (NPI), such as Cognitive Stimulation Therapy (CST), in AD provide health benefits. A literature review shows that NPI improve the QOL of patients with AD (Carvalho et al., 2016). Luxton et al. (2025) found that current evidence highlights the importance of NPI and multidisciplinary care for supporting QOL of PWD. Few studies assessed QOL of patients with AD in Portugal.

Our objective was to conduct a study on the impact of NPI on the QOL of people with AD.

2. Materials and methods

In this study, two samples were constructed with different purposes. The first sample consists of patients undergoing NPI. The second sample constituted the control group, being as similar as possible to the first, with the exception that in this group the patients were not subjected to NPI.

Data were collected on HRQOL scales (QOL-AD and EQ-5D-3L) for both the NPI and control groups at two time points, separated by approximately 9 months. Similarly, a neuropsychological assessment was conducted at two equivalent moments for both groups. Additionally, data on dementia severity, as well as the neuropsychological and functional profile, were collected.

Ethical principles were followed during the entire study period.

2.1. Samples and Participants

In the first sample, forty patients diagnosed with AD followed in a dementia service underwent NPI in an outpatient setting. The patients were part of CST groups with a maximum number of eight participants. CST groups were created according to dementia staging. All patients undergoing NPI had a diagnosis of AD. This diagnosis was obtained according to the criteria of the DSM-5-TR (American Psychiatric Association Diagnostic and Statistical Manual of Mental Disorders, 2022) and the Alzheimer's Association and the National Institute on Aging (Knopman et al., 2018). All patients underwent a multidisciplinary assessment and underwent an assessment protocol, which included an assessment by a psychiatrist, nursing assessment and assessment by a clinical psychologist.

Although some patients had comorbidities, no patient suffered from a serious illness, and all had normal or corrected hearing and vision conditions. The patients knew how to read and write. None of the patients with AD presented psychological or behavioral changes, information obtained through multidisciplinary evaluation and monitoring. The clinical psychologists who implemented the NPI were part of the multidisciplinary team of the psychogeriatrics service where the intervention was carried out.

CST is a NPI used to help people with mild to moderate dementia. It involves engaging participants in themed activities designed to stimulate cognitive function and social interaction. CST is based on the principle that cognitive functions such as memory are not used in isolation but require integration with other functions such as attention/orientation, language or problem solving. This type of intervention makes it possible to: (a) develop ways of dealing with cognitive deficits, using internal and external compensatory strategies; (b) increase the sociability of participants. Thus, NPI through CST has an impact on other dimensions of the person, such as the functional and psycho-affective relational dimensions and improves the well-being and QOL of the participants.

The second sample, the control group, included forty patients with a diagnosis of AD in a dementia service who did not receive CST but were as similar as possible to the initial sample.

2.2. Instruments

In this study, data regarding performance in neuropsychological, functional and QOL assessment tests were collected: CDR (Morris, 1993), MMSE (Folstein et al., 1975), ACE-R (Mioshi et al., 2006), Barthel Index (Baztán et al., 1993) and Lawton and Brody Index (Lawton & Brody, 1969). This study collected data on the results of other specific instruments to assess patients with AD. To assess QOL, the QOL-AD – Quality of Life-Alzheimer's Disease Scale – was used, which is a specific measure to assess QOL for people with AD. The QOL-AD scale was developed in 1999 by Logsdon and collaborators (Logsdon et al., 2002) and consists of 13 items, rated on a 4-point Likert scale (Poor, Fair, Good and Excellent). The higher the value obtained on this scale, the better the QOL of the person evaluated. This instrument was validated for the Portuguese population by Bárrios (2013). To assess HRQOL, the EQ-5D-3L was also used, a generic preference-based measure of QOL that provides supporting data for clinical and political decisions. EQ-5D-3L utility values can be easily converted to quality-adjusted life years and used to conduct cost-utility analyses in economic assessments (Ferreira et al., 2023).

2.3. Design and procedures

We used a longitudinal observational intervention study, which involved repeatedly measuring the same individuals with AD over a period while introducing NPI to observe their effects. This type of study combines the characteristics of a longitudinal design, which tracks changes over time, with an intervention, which introduces a specific treatment. It is observational because, although there is an intervention (NPI; CST), the data were collected through clinical and sociodemographic assessments, without any manipulation of variables during the collection period. It is longitudinal because it occurred at two distinct points in time, 9 months apart, allowing for observation of variations over time.

Data collected from paper and digital patient records included sociodemographic and clinical data. Data analysis made it possible to carry out a sociodemographic characterization of the samples. Data for this study were collected from January to April 2023, at the psychogeriatrics service of Hospital Magalhães Lemos, which provides mental health care to patients diagnosed with AD in Porto, Portugal.

Since only the CST was used, it was possible to compare the groups in which CST was used versus the control condition. All 40 participants who attended a CST group were recruited after undergoing a multidisciplinary evaluation at the psychogeriatric service and meeting the criteria for inclusion in the CST group. Patients included in the control group were also recruited after undergoing a multidisciplinary evaluation (same protocol as the "intervention group") at the same service. All participants in the intervention group attended the group once a week. All participants in the intervention group attended CST sessions and were divided into groups between early 2019 and late 2022.

We characterized the cognitive and functional profile of patients diagnosed with dementia, taking care to divide these patients into 3 groups with different levels of dementia staging (mild, moderate and severe), according to the CDR result and calculating, for each of these groups. Values were also obtained from neuropsychological and functional assessment tests (MMSE, ACE-R, Barthel Index and Lawton Index). This study explored the data through descriptive statistics. To infer and validate the results, the two groups (case, control) were paired according to sociodemographic characteristics, using the non-parametric tests of Pearson's Chi-Square and Fisher's exact test, as well as odds ratio (OR) association measures and 95% confidence interval for the OR. This procedure made it possible to identify the similarity between the distributions of the two groups, necessary to make them comparable and minimize possible distortions during the neuropsychological, functional and dementia staging assessment. These evaluations were continued in the "intervention group" (IG) and the "control group" (CG) using the Wald test of multivariate logistic regression. All tests used a 0.05 significance level. The tests are one-tailed, as, according to theory, it is expected that risk factors will affect patients who have undergone NPI more positively than those without NPI.

3. Results

The control sample checks the representativeness and comparability criteria. The cases are representative of the target population, according to the inclusion criteria, as well as the control cases have identical distributions to the intervention cases, as shown in Table 1. This table presents the sociodemographic and clinical characterization of the 2 samples. There are no significant differences between the two groups, according to the Chi-Square tests and association measures (OR and 95% CI OR), denoting the comparability between the samples. It is also verified that 73.8% of patients in both groups take anti-dementia medication (Fisher's exact test with $p = 0.612$) and have the same number of years with AD (Wald test = 3.381, $p = 0.07$).

Table 2 presents the results obtained in the neuropsychological, functional and dementia staging tests in the two assessments performed for the IG and CG. All variables subjected to multivariate logistic regression result from the differences between the two assessment moments in the IG and CG (p-test column for differences). At each assessment time, patients who received NPI were compared with those in the CG. The Wald test showed no significant differences between the two groups at any time point in the following cognitive assessment tests: Attention/Concentration, Memory, Fluency, Language, and Visuoconstructive. In the remaining assessments, the time factor significantly differentiated them, namely, the Barthel index ($p = 0.014$), indicating better functional performance in the intervention group; the MMSE ($p = 0.012$), which also demonstrated cognitive improvement in the intervention group compared to the control group; and the CDR ($p = 0.011$), which showed a higher proportion of cases with CDR = 1 in the intervention group in the second assessment

Table 1. Sociodemographic and clinical characterization

Sociodemographic and clinical characterization	Intervention Group (n=40)	Control Group (n=40)	P value
Sex			
Women, % (n)	80 (32)	72.5 (29)	0.451
Men, % (n)	20 (8)	27.5 (11)	
Marital status			
Married, % (n)	65 (26)	47.5 (19)	0.295
Widower, % (n)	25 (10)	45 (18)	
Single, % (n)	5 (2)	2 (5)	
Divorced, % (n)	5 (2)	1 (2.5)	
Education			
Illiterate, % (n)	2.5 (1)	2.5 (1)	0.459
Reading and writing, % (n)	2.5 (1)	12.5 (5)	
4 years, % (n)	55 (22)	65 (26)	
9 years, % (n)	12.5 (5)	2.5 (1)	
11-12 years, % (n)	10 (4)	2.5 (1)	
>12 years, % (n)	17.5 (7)	15 (6)	
Age, Mean (SD) (At)	78.60 (6.508) (65-93)	9.55 (6.457) (67-93)	0.514
Years of education, Mean (SD) (At)	7.03 (4.526) (1-17)	5.73 (4.132) (0-15)	0.184
Number of years with dementia, Mean (SD)	3.97 (0.37)	3.07 (0.28)	0.07

SD: Standard Deviation; At: Amplitude Total – Min/Max.

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Table 2. Impact of non-pharmacological intervention - Neuropsychological and functional assessment of patients with dementia undergoing non-pharmacological intervention and control group

Neuropsychological and functional assessment	First assessment Intervention Group	First assessment Control Group	Second assessment Intervention Group	Second assessment Control Group	P value
Barthel Index, mean (SD)	97.75 (6.97)	90.63 (13.06)	96.25 (8.06)	84.62 (17.40)	0.014
Lawton Index, mean (SD)	18.25 (4.71)	19.33 (5.5)	18.67 (4.74)	22.65 (5.63)	0.028
MMSE, Mean (SD) (At)	22.55 (13-29) (3.74)	19.80 (13-27) (3.71)	21.88 (13-29) (4.43)	18.25 (9-25) (3.96)	0.012
ACE-R, Mean (SD) (At)	64.93 (33-84)	52.62 (30-76)	62.83 (32-82)	52.57 (32-76)	0.032
ACE-R (Subtests)					
Attention/concentration, Mean	14.21	11.38	13.61	13.71	0.594
Memory, Mean	10.25	7.62	9.65	6.85	0.395
Fluency, Mean	4.75	3.11	5.09	2.48	0.244
Language, Mean	21.57	20.51	21.83	21.142	0.399
Visuoconstructive, Mean	13.39	10.95	12.87	10.71	0.051
Clinical Dementia Rating					
CDR=1, % (n)	90 (36)	82.5 (33)	90 (36)	57.5 (23)	0,011
CDR=2, % (n)	10 (4)	17.5 (7)	10 (4)	35 (14)	
CDR=3, % (n)	0 (0)	0 (0)	0	7.5 (3)	

p: Wald-test, Sig. (1-tailed); SD: Standard Deviation; At: Amplitude Total – Min/Max.

In the Barthel Index, when a person scores 100 points, they are independent in BADL, and when they have a score below 20 points, they are completely dependent. The Lawton and Brody Index was used to evaluate instrumental activities of daily living. When the person is completely independent, they score 8 points and when they need much help to carry out tasks they score more than 20. In the MMSE the maximum points a person can obtain is 30. Both groups obtained, on average, worse results in the second assessment than in the first assessment, with the CG suffering a greater worsening of the values obtained in these cognitive and functional assessment tests.

Observing the impact of NPI on the QOL of PWAD in Table 3, we found a significant difference between the results in the first and second assessments, with higher QOL values, assessed with the QOL-AD, and obtained in the post-intervention assessment (Wald test = 9.679; p = 0.002). In contrast, the CG had a lower result in the second QOL assessment compared to the first.

Table 3. Comparison between the first assessment and the second assessment with quality of life assessment test between the intervention group and the control group

Quality of life assessment test	First assessment Mean (SD)	Second assessment Mean (SD)
QOL-AD Intervention Group	31,60 (4,89)	32,77 (5,43)
QOL-AD Control Group	28,60 (3,72)	25,73 (4,44)

We also applied the EQ-5D-3L to the two groups evaluated. The EQ-5D-3L is a scale that assesses HRQOL. Table 4 presents the frequency distribution (%) of the EQ-5D-3L dimensions obtained in the IG and CG. So, the percentages represent the distribution of responses for each EQ-5D-3L dimension for patients undergoing NPI and CG across severity levels (no problems, some problems, severe problems). From the analysis of the answers given to each of the dimensions of the EQ-5D-3L, it is possible to verify that most patients fall within the first two levels: no problems or some problems. In the second evaluation, only 2.5% of the sample of patients undergoing NPI presented serious problems with personal care and 15% with usual care. While in this second evaluation, patients in the CG presented 45% of serious problems with usual care.

Comparing the frequency distribution of the EQ-5D-3L dimensions relative to patients undergoing NPI and the frequency distribution of the EQ-5D-3L dimensions relative to CG patients, the two groups evolve in a different way in relation to the assessment of health status. For example, the IG had clear benefits in relation to the "usual care" dimension.

Table 4. Frequency distribution of the EQ-5D-3L dimensions for patients undergoing non-pharmacological intervention and the control group

Dimension	**1: no problem**				**2: some problems**				**3: serious problems**			
EQ-5D	**First assessment**		**Second assessment**		**First assessment**		**Second assessment**		**First assessment**		**Second assessment**	
	IG %	**CG %**	**IG %**	**CG %**	**IG %**	**CG %**	**IG %**	**CG %**	**IG %**	**CG %**	**IG %**	**CG %**
Mobility	97.5	77.5	97.5	72.5	2.5	22.5	2.5	27.5	0	0	0	0
Personal care	85.0	52.5	75.0	30.0	12.5	42.5	2.5	50.0	2.5	5.0	2.5	2.0
Usual care	12.5	12.5	10	2.5	75.0	67.5	75	52.5	12.5	20.0	15	45.0
Pain-malaise	80	87.5	90	82.5	20	12.5	10	17.5	0	0	0	0
Anxiety/depression	67.5	72.5	90	67.5	30.0	27.5	10	32.5	2.5	0	0	0

Table 5. Mean relating to health status weights (with the EQ-5D-3L) by sex

Mean value EQ-5D-3L	Intervention Group (Mean)		Control Group (Mean)	
	Women	Men	Women	Men
First evaluation	0.61244	0.69188	0.55759	0.52727
Second evaluation	0.58984	0.71950	0.39072	0.40800

Table 5 presents the averages for the health status values obtained through the application of the EQ-5D-3L instrument to the 80 patients. Both groups of patients suffered a deterioration in their health status, with worse results in the second assessment compared to the first assessment. However, people in the IG suffered less deterioration in their health status.

4. Discussion

AD is a neurodegenerative dementia in which people experience cognitive and functional decline over time. The course of dementia should be as benign and slow as possible, with minimal loss of health status, which can be achieved with the implementation of NPIs in addition to pharmacological intervention. We studied the QOL in patients with AD undergoing NPI and sought to test whether the QOL did not progress.

In this study, regarding the results obtained in the assessment of QOL with the QOL-AD in the two evaluation moments and in the two groups evaluated, the IG obtained better results than the CG in the second evaluation, which indicates that the NPI allows the occurrence of health gains. The means obtained regarding the health status values through the application of the EQ-5D-3L instrument in 80 patients demonstrated that people in the IG suffered less deterioration in their health status. In agreement with Farina et al. (2020), we also found that QOL does not necessarily decrease over the course of dementia.

Improving QOL is a care priority for PWD. NPI have the potential to significantly impact disease management by potentially slowing disease progression and enhancing overall QOL. The results of this study are in line with the results of other studies already conducted. We agree with Cammisuli et al. (2016), who consider that NPI represent complementary techniques and should be adapted on a case-by-case basis, according to the medical condition and resilience of patients, adherence to treatment, severity of AD, available health and professional resources, and commitment and support to the caregiver. As in the review study by Carvalho et al. (2016), we were able to demonstrate that NPI treatments have great potential to attenuate disease progression and improve QOL. Our study confirmed the publication by Luxton et al. (2025), who found that current evidence highlighted the importance of NPI to support the QOL of PWD.

In this study, it was possible to monitor the cognitive, functional and QOL levels of PWAD over time and specifically study their QOL.

The limitation of this study was that a small sample was used, which makes comparisons with other programs implemented in other health services and their generalization difficult. Another limitation was the lack of random assignment, which may have introduced bias.

5. Conclusions

This study added new information on the impact of NPI, specifically on the QOL of PWAD in Portugal, given the lack of experience with the use of NPI and the scarcity of studies on the subject. In the absence of a cure using pharmacological interventions, NPI have a positive impact on PWAD, providing benefits in a more benign course of the disease and may improve the QOL.

In this study, the group that received NPI obtained better results than the CG in the second assessment regarding scores on functional, cognitive and QOL assessment tests. We demonstrate that QOL does not necessarily decrease as dementia progresses and that NPI contribute to making this possible.

This study supports the recommendation that tailored interventions for AD patients be implemented, including NPIs that improve QOL.

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