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Effectiveness of a chess-training program for improving cognition, mood, and quality of life in older adults: A pilot study

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ABSTRACT

Background: Regular practice of a cognitively stimulating activity, such as chess, can help maintain a healthy cognitive, social, and psychological state during the aging process.
Objective: To evaluate the effects of a chess-training program on cognitive status, mood, and quality of life (QoL) in a sample of institutionalized and semi-institutionalized older adults.
Method: A nonrandomized, controlled pilot study with repeated measures (pre- and post-intervention) was conducted.
Results: Analyses revealed a positive impact of the chess program on general cognitive status ($p < 0.001$) and promising evidence ($p < 0.043$) of an impact on attention, processing speed, and executive functions. The participants in the intervention group also showed significant improvement in QoL scores ($p < 0.021$).
Conclusions: A 12-week chess-training protocol with two 60-minute sessions per week improved cognition and QoL in a sample of institutionalized and semi-institutionalized older adults. Further research with larger samples is needed to explore its effects in depth.

Introduction

The World Alzheimer Report 2018[1] reported that dementia is one of the most important health problems in our society, with 50 million people affected by dementia worldwide. In recent decades, there has been growing interest in the investigation of modifiable lifestyle factors that may be crucial in the presymptomatic phases of mild cognitive impairment (MCI) or dementia, with the intention of developing potential preventive strategies.[2] These modifiable lifestyle factors include participation in cognitively stimulating leisure activities, since existing evidence from a meta-analysis reported consistent links between their practice and reductions in the risk of developing cognitive impairment and dementia in later life.[3] Numerous international investigations have reported that stimulating mental activities are a highly relevant variable in the maintenance of cognitive function during the aging process since engaging in these activities contributes to increasing cognitive reserve. Cognitive reserve is a hypothetical construct referring to the adaptability of cognitive processes that may explain the differential susceptibility of cognitive abilities to brain aging or pathological changes such as those occurring in Alzheimer's disease (AD).[4,5] High lifespan cognitive reserve has been associated with reductions in the risk of MCI and delays in its progression to dementia.[6] Cognitive reserve is influenced by numerous factors, such as level of education, occupational attainment, intelligence, changes in life situations (divorce, retirement, etc.), social interactions, physical activity, or participation in cognitively stimulating activities across the lifespan.[7–10] Therefore, changes in lifestyle, even in later life, might modify cognitive reserve, which could help individuals achieve more successful aging against age-related cognitive decline or the possible development of MCI or dementia.[5,6]

An active lifestyle with regular and frequent practice of mentally stimulating activities appears to delay the onset of pathologies associated with cognitive decline.[5,11,12] Furthermore, some investigations have reported social and psychological benefits derived from the practice of cognitively stimulating leisure activities, since the vast majority of these activities tend to take place in the context of social relationships.[10,13] One type of these activities is board games, including chess, as they are one of the most stimulating leisure activities that older people can easily practice.[14] Some studies[15,16] have shown that playing board games has cognitive benefits, specifically in terms

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of working memory, logical reasoning, executive functions, and processing speed. An article published by Coyle[17] showed a significant relationship between effortful mental activities, including chess practice, and a reduced probability of developing dementia; however, research along this specific line has scarcely been developed to date, and most of the published studies have been correlational, which precluded making causal inferences. More investigation in this field is needed to further explore the effects that regular practice of cognitively stimulating activities, such as playing chess, can have in advanced age stages.

The main objective of this study was to evaluate the effects of participating in an intervention program based on chess training on cognitive status, mood, and QoL in a sample of institutionalized and semi-institutionalized older adults. The proposed chess-training protocol could be easily implemented as a nonpharmacological intervention in diverse care institutions for older adults.

Our study was based on the hypothesis that the regular practice of stimulating cognitive activities, such as chess, can reduce the risk of developing cognitive impairment and dementia and contribute to maintaining a healthy cognitive status. Considering that chess is an activity that involves high mental and social components,[18] we expected to obtain cognitive, social, and psychological benefits, thus positively influencing the quality of life (QoL) of older people.

Material and methods

Design

This study was designed as a nonrandomized, controlled pilot study with repeated measures (pre- and post-intervention). Thus, outcomes of interest were assessed before and after administering the program in both the experimental and control groups.

The research protocol (code 2019/582) was reviewed and approved by the Autonomic Research Ethics of Galicia Committee (Spain), and the study was developed following the ethical standards embodied in the Declaration of Helsinki. Written informed consent was obtained from all participants or proxies in case of cognitive decline.

Participants

The sample was obtained from among the users of a gerontological complex located in A Coruña (Spain). This complex is composed of two institutionalization modalities: a daycare center and a nursing home. As a function of the setting, the participants were considered institutionalized (residents of the nursing home) or semi-institutionalized (users attending daycare center).

Participants were selected based on the following inclusion criteria: (a) subjects aged ≥60 years; (b) visual and auditory function intact or corrected; and (c) agreement to participate in the study. As a criterion of exclusion, individuals in advanced stages of dementia (moderately severe, severe, and very severe) measured by a score greater than 4 on the Global Deterioration Scale (GDS)[19] were not included in the study. The legal decisional capacity of the participants was confirmed by the physicians and clinicians of the center based on their clinical judgment and the GDS scores of the patients, assuring their capacity to understand the research protocol and to decide to participate in the study. Additionally, individuals were not eligible for the study if they presented any disorder or disease that precluded the development of the necessary manipulative actions for the practice of chess that could have interfered with participation in the training program.

At the end of the recruitment process, 32 subjects met the inclusion and exclusion criteria described above, although only 22 participants completed the entire study (see Fig. 1).

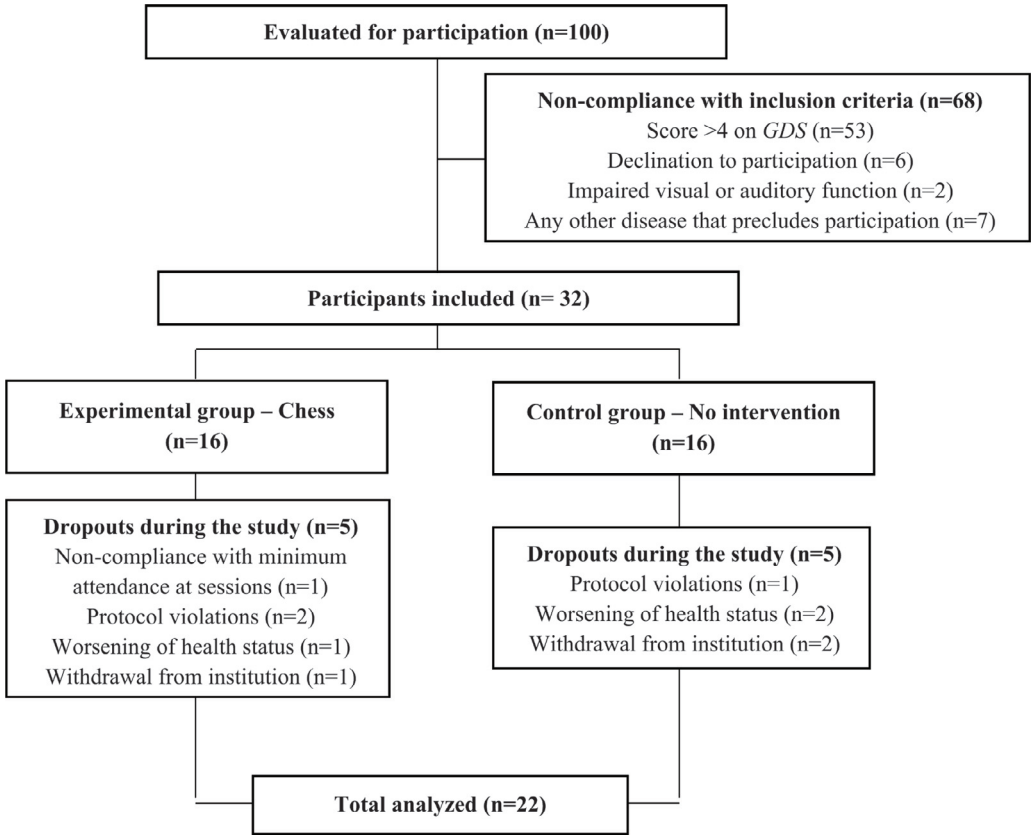

Fig. 1. Flowchart of study participants. Recruitment, sampling, and dropouts throughout the study.

Procedure

An informative talk was held at the gerontological complex addressed to potential study participants, in which they were informed about the nature and objectives of the study. Once informed consent was obtained, the sample was selected based on the inclusion and exclusion criteria described above, and individuals were assigned to groups. The assignment of participants to each group was made by convenience based on their interest in receiving chess training.

The participants were assessed during a baseline neuropsychological evaluation lasting 45–60 min, depending on the level of cognitive impairment of each participant. The subjects in both groups were subsequently evaluated after completing the chess program and this evaluation was identical to the initial evaluation.

The chess-training program was conducted in group sessions taught by two expert chess trainers and supervised by one of the researchers together with a therapist from the center. The sessions were held in a specially designed room within the gerontological complex itself, mixing institutionalized and semi-institutionalized participants. The participants in the experimental group were trained for 12 weeks in two weekly sessions of 1 h. The program consisted of 24 sessions, and it was established that participants needed to attend at least 80% of the training sessions to be able to ensure results. The subjects in the control and experimental groups continued with the routine daily activities of the gerontological complex.

The set of classes ranged from the most basic knowledge (introduction of the chessboard and the pieces and basic game rules) to the most complex (specific tactics), encompassing all the specific concepts necessary to acquire the basic knowledge and skills to play chess. The same structure was used in all the sessions, which began with a brief theoretical explanation followed by practical exercises. Practice and repetition were essential, and the fact that the participants could progress at different rates was considered. The level of these exercises was adjusted based on each participant with a consideration of both their cognitive state and their ability to follow the sessions. A single concept was addressed in each session, and each session included a review of what had been learned in the previous one, until the participants were able to independently play basic games.

Instruments and outcomes measures

As previously stated, the participants in both groups were assessed at two time points, i.e., before and after the intervention program. All instruments were administered by two gerontologists with experience in neuropsychological assessments. The primary outcome measures were the assessment of cognition, mood, and QoL. Moreover, in the post-intervention assessment of the experimental group, two additional questions were included: a five-point Likert scale question about their level of satisfaction with the chess program and a dichotomous question (yes/no) about their motivation to continue if the program were offered again.

Cognition

The neuropsychological evaluation of cognition included measures of general cognitive status, as well as more specific assessments of particular cognitive domains. The Montreal Cognitive Assessment test (MoCA)[20] is a screening instrument used to evaluate general cognitive status covering 8 domains of cognition: attention, executive functions, memory, language, visuospatial abilities, abstract thinking, calculation, and orientation. The MoCA standardization for the Spanish population[21] was taken into account to adjust the total score based on the age and years of formal education of each participant.

Regarding the evaluation of specific cognitive domains, we used the Trail Making Test (TMT)[22] and the Visual Benton Retention Test (VBRT).[23] TMT[22] evaluates attention, processing speed, and executive functions. This test has two different parts (A and B), both consisting of a sheet of paper with 25 circles randomly distributed over it. In Part A, the subject must draw lines to connect numbers in ascending order; Part B includes numbers and letters, and the subject must join them following an ascending pattern and alternating between numbers and letters. The VBRT[23] contains three sets of ten geometric figures, and four alternative methods of assessment (A, B, C, and D); we used application methods A and C. Method C allows the evaluation of visuoperceptual and visuospatial abilities and consists of copying the figures from each card without a time limit. Method A was used to assess visual memory: each stimulus was shown for 10 s, the card was then removed, and the subject was asked to reproduce the design by immediate recall.

Mood

The mood of participants was assessed using the Geriatric Depression Scale Short Form (GDS-SF)[24] to detect the presence of depressive symptoms. The GDS-SF is made up of 15 items with a yes/no dichotomous answer about how the person has been feeling in the last two weeks.

Quality of life

QoL of the participants was evaluated with the WHOQOL-OLD,[25] an additional module on the WHOQOL scale,[26] specifically developed for the evaluation in older adults of their subjective perception about their QoL. The WHOQOL-OLD module contains 24 five-point Likert-scale items organized into six facets, covering the main aspects of QoL in old age: 1) sensory abilities, 2) autonomy, 3) past, present, and future activities, 4) social participation, 5) death and dying and 6) intimacy. The questionnaire asks the patients for their thoughts and feelings about these aspects of their QoL in the last two weeks. The six facets contain four items each, and for all facets, the possible scores can range from 4 to 20. The total score is based on the summation of all 24 items in the module, with higher scores representing higher QoL.

Statistical analysis

Before all the analyses, the Shapiro-Wilk test was used to assess normality of the distribution of the variables. For subsequent analyses, we applied nonparametric tests since the normality assumption was not met and the sample size was small ($n < 30$).

The baseline characteristics of the sample were analyzed using descriptive statistics and frequency distributions (see Table 1). Considering the small sample size of the groups, these sociodemographic characteristics were compared using nonparametric tests to analyze between-group differences at baseline, namely, Mann-Whitney U tests were used for quantitative variables, and chi-square tests were used for categorical variables.

Brunner-Langer mixed nonparametric ANOVA[27] following an F1-LD-F1 design where the group was the whole-plot factor and time the subplot factor was used to test the effects of the intervention (chess program vs. control) and its interaction with time on MoCA, VBRT, TMT, GDS-SF, and WHOQOL-OLD scores. Pairwise comparisons were made with the Wilcoxon signed-rank and Mann-Whitney U tests. Wilcoxon signed-rank tests were used to compare the test scores before and after the intervention in each group, and Mann-Whitney U tests was used to compare the scores between the control and intervention groups at each of the two time points. A p-value < 0.05 was set to define statistical significance. All statistical analyses were performed with the statistical software IBM SPSS Statistics v.25.0 and the statistical software R v.3.6.1 (using R packages Rcmdr, MASS, and nparLD).

Table 1
Sociodemographic characteristics of the study population.

	Total sample (*n* = 22)	Control group (*n* = 11)	Chess group (*n* = 11)	p-value
Gender, n (%) [a]				0.006**
Female	15 (68.2)	11 (100)	4 (36.4)	
Male	7 (31.8)	0 (0.0)	7 (63.6)	
Age [b]				0.263
Mean age ± SD	83.05 ± 8.19	85.73 ± 5.61	80.36 ± 9.68	
Age range	64 – 94	76 – 94	64 – 93	
Setting, n (%) [a]				0.669
Daycare center	10 (45.5)	4 (36.4)	6 (54.5)	
Nursing home	12 (54.5)	7 (63.6)	5 (45.5)	
Marital status, n (%) [a]				0.133
Single	1 (4.5)	0 (0.0)	1 (9.1)	
Married	6 (27.3)	1 (9.1)	5 (45.4)	
Widower	13 (59.1)	9 (81.8)	4 (36.4)	
Divorced/Separated	2 (9.1)	1 (9.1)	1 (9.1)	
Years of formal education [b]				0.484
Mean ± SD	8.86 ± 3.63	8.91 ± 3.45	8.82 ± 3.97	
Range of years	0 – 17	0 – 13	3 – 17	
Level of cognitive impairment[†]**, n (%)** [a]				0.801
Severe	12 (54.6)	7 (63.6)	5 (45.4)	
Moderate	3 (13.6)	1 (9.1)	2 (18.2)	
Mild	4 (18.2)	2 (18.2)	2 (18.2)	
No impairment	3 (13.6)	1 (9.1)	2 (18.2)	

[a] Chi-square test.
[b] Mann–Whitney U test.
** $p<0.01$.
[†] Level of cognitive impairment established based on the cutoff points for the Montreal Cognitive Assessment Test (MoCA) in the Spanish population.

Results

Sample characteristics

The final sample consisted of 22 subjects, with 11 individuals per group. Table 1 shows the baseline sociodemographic characteristics and the level of cognitive impairment of the participants. The mean age of the participants was 83.05 ± 8.19 years, and 68.2% of the sample were women. The marital status of most of the participants was widowhood (59.1%). Regarding educational level, the average number of years of formal education completed was 8.86 ± 3.63, ranging from 0 to 17 years. Finally, concerning the level of cognitive impairment, slightly more than half of the sample (54.6%) presented severe cognitive impairment at the beginning of the study based on the MoCA cutoff points adjusted for age and education.

At baseline, there were no significant differences between chess and control groups for these characteristics, with the exception of gender since the control group was entirely composed of women.

Table 2 shows the medians, interquartile ranges, means, and SDs for each group on every instrument used at the evaluations as well as the results of the Wilcoxon signed-rank and Mann-Whitney U tests. We decided to include both medians and means: medians due to the nonparametric analyses utilized and means to facilitate the interpretation of the test scores.

Effects of the chess-training program on cognition

The mixed nonparametric ANOVA results showed that the group-time interaction effect was significant ($p < 0.001$) only with the MoCA scores. Pairwise comparisons showed significant improvements in the MoCA scores ($p = 0.003$) in the chess group from before to after the intervention program as well as significant differences ($p = 0.006$) between groups with the post-intervention scores being higher in the chess group.

Regarding the TMT-Part A, for both groups, the task execution time decreased in the post-intervention compared to the baseline assessment, without significant differences between groups or over time. On the other hand, Part B was not fully completed in 15 cases due to comprehension difficulties, so only seven participants (two from the control group and five from the chess group) completed TMT-Part B in both assessments. The participants in the chess group who completed TMT-Part B showed improved performance, with significantly lower execution time ($p = 0.043$) after the intervention program.

Regarding the VBRT, when comparing the two evaluation time points, the scores hardly varied in both groups. The VBRT, with its two methods of application, did not show significant intergroup differences or significant time effects.

Effects of the chess-training program on mood

Depressive symptomatology measured by GDS-SF was significantly lower in the patients in the chess group at both evaluation time points (before: $p = 0.048$; after: $p = 0.023$) than in the control group participants. No significant effects were observed within each group over time.

Effects of the chess-training program on quality of life

The Wilcoxon signed-rank test showed significant differences ($p = 0.021$) in the WHOQOL-OLD scores from before to after the intervention program in the participants who received the chess sessions. The WHOQOL-OLD scores remained stable in the comparison of pre- and post-intervention evaluations, and no significant differences were found between the groups.

Acceptability, feasibility, and perceived satisfaction with the chess-training program

Our findings demonstrate the preliminary acceptability and feasibility of the chess-training program with some positive impacts on general cognition and QoL. Regarding acceptability, the mean number of attended classes was 22.73 ± 1.27 out of 24 sessions across 12 weeks, showing adequate adherence. The reason for not attending a class was always due to medical reasons. To assess overall chess skill acquisition, a test was individually administered to each participant

Table 2
Comparisons of intragroup and between group test scores at baseline and post-intervention.

	Control group (n = 11)			Intervention - chess group (n = 11)			Control vs chess group (p-value[b], between groups)	
	Before	**After**	**p-value[a] (intragroup)**	**Before**	**After**	**p-value[a] (intragroup)**	**Before**	**After**
MoCA score			0.670			0.003**	0.130	0.006**
Median (IQR)	8.0 (7.0–15.0)	9.0 (6.0–14.0)		13.0 (10.0–18.0)	16.0 (14.0–23.0)			
Mean±SD	11.1 ± 6.0	10.7 ± 5.6		13.9 ± 5.4	18.3 ± 5.7			
TMT-A score			0.260			0.091	0.158	0.094
Median (IQR)	265.4 (178.6–295.1)	193.4 (148.7–311.3)		156.4 (78.2–255.1)	109.0 (67.8–195.4)			
Mean±SD	248.4 ± 121.3	216.9 ± 94.1		180.3 ± 113.5	162.2 ± 147.7			
TMT-B score†			0.655			0.043*	1.000	0.699
Median (IQR)	386.2 (133.3–386.2)	284.1 (135.6–284.1)		348.5 (183.2–436.4)	253.0 (165.0–379.4)			
Mean±SD	386.2 ± 357.6	284.1 ± 210.0		317.5 ± 132.2	268.3 ± 115.9			
VBRT-A score			0.317			0.287	0.206	0.082
Median (IQR)	1.0 (0.0–2.0)	0.0 (0.0–2.0)		2.0 (1.0–2.0)	2.0 (0.0–5.0)			
Mean±SD	1.3 ± 1.3	1.0 ± 1.4		1.9 ± 1.6	2.6 ± 2.2			
VBRT-C score			0.607			0.206	0.319	0.083
Median (IQR)	7.0 (2.0–8.0)	6.0 (2.0–8.0)		8.0 (5.0–9.0)	8.0 (5.0–9.0)			
Mean±SD	5.8 ± 3.1	5.6 ± 2.7		7.0 ± 2.5	7.4 ± 2.1			
GDS-SF score			0.483			0.549	0.048*	0.023*
Median (IQR)	3.0 (2.0–8.0)	5.0 (2.0–9.0)		2.0 (1.0–4.0)	2.0 (1.0–3.0)			
Mean±SD	4.73±3.2	5.6 ± 3.9		2.7 ± 2.1	2.4 ± 2.4			
WHOQOL-OLD			0.594			0.021*	0.869	0.429
Median (IQR)	88.0 (75.0–92.0)	86.0 (79.0–101.0)		87.0 (82.0–90.0)	95.0 (90.0–99.0)			
Mean±SD	86.6 ± 8.4	89.5 ± 15.8		86.8 ± 6.8	95.3 ± 7.4			

[a] Wilcoxon signed-rank test.
[b] Mann–Whitney U test.
* $p<0.05$.
** $p<0.01$.
† The number of participants completing this test was 7 (2 in the control group and 5 in the intervention group).Abbreviations: GDS-SF= Geriatric Depression Scale; IQR= interquartile range; MoCA= Montreal Cognitive Assessment; TMT-*A*= Trail Making Test-Part A; TMT-*B*= Trail Making Test-Part B; VBRT-*A*= Visual Benton Retention Test, Administration A (immediate memory); VBRT-*C*= Visual Benton Retention Test, Administration C (copy).

by the trainers at the end of the program. The test assessed learning the position and basic moves of each piece on the chessboard and the capacity to identify check or checkmate positions with no assistance. A total of 90.9% of the participants learned the correct position of the pieces on the chessboard. Regarding the basic moves of the pieces, all the participants learned how to correctly move the pawns, 90.9% learned how to move the bishops and the queen, and 81.8% learned how to move the rooks, the knights, and the king. Finally, 81.8% learned to identify check and checkmate tactics. The other participants were able to perform the moves after initial guidance from the teachers. Finally, satisfaction with the program was evaluated with a five-point Likert scale (very satisfied, satisfied, neither satisfied nor dissatisfied, dissatisfied and very dissatisfied) at the end of the program. A total of 72.7% of the participants were very satisfied or satisfied with the chess program, and 27.3% were neither satisfied nor dissatisfied. Importantly, all the participants expressed their intention and motivation to continue playing chess, and the program was implemented as a nonpharmacological treatment for dementia in the gerontological complex.

Discussion

This study examined the effects of a chess intervention program on cognition, mood, and QoL in institutionalized or semi-institutionalized older people. The analysis showed that the chess program had a positive impact on general cognitive status. Regarding specific cognitive domains, our results showed promising improvements on attention, processing speed, and executive functions and no effect on visuospatial abilities and visual memory. Regarding mood, we cannot draw firm conclusions, as there were existing differences between the groups at baseline. Regarding QoL, the intervention group showed improvement after the chess program.

Our results in terms of general cognition were in line with those provided in a recent review,[28] which stated that regular chess practice could be considered a protective factor against cognitive decline in older people. Our outcomes also concur with other existing studies that reported that regular practice of cognitively stimulating activities, such as playing board games, was associated with a decreased risk of dementia[3,11,14,18,29–34] and MCI.[2,11,35,36] Likewise, some studies have shown that frequent participation in cognitive activities is related to attenuated cognitive decline.[3,12,37,38] Other authors have also reported that engaging in hobbies in later life, including board games such as Japanese chess, contributed to the preservation of cognitive function.[39]

Regarding specific cognitive domains, in our study, attention, processing speed, and executive functions showed significant improvements in the chess group measured as a decrease in execution time on the TMT-Part B during the post-intervention assessment. The TMT-Part B results were only analyzed with seven individuals owing to missing data because of the inability of some participants to complete this part due to their level of cognitive impairment. Despite not including these data in the analysis of results, we consider it important to note that two participants in the control group showed a tendency to worsen since they had been able to complete the task during the baseline assessment but not in the post-intervention assessment. Likewise, in the experimental group, one of the participants showed a trend for improvement. This participant had not been able to complete TMT-Part B in the initial assessment, but she completed it in the post-intervention evaluation, and achieved adequate execution with values above the cutoff point established as deficient by Reitan.[22] Other studies have also supported the idea that chess practice leads to improvements in specific cognitive domains. A resistance training program combined with chess playing in a group of older women[40] resulted in better spatial orientation, attention, calculation, recall, and language on the Mini-Mental State Examination.[41] The results of a recent meta-analysis[42] revealed a significant

positive correlation between chess skills and processing speed, short-term memory, fluid reasoning, and comprehension. Another study using the Ska game revealed improvements in memory, attention, and executive function after an intervention program.[43] Another study[44] also concluded that greater participation in leisure activities, including playing chess, lessened the decline in processing speed. Moreover, a recent systematic review and meta-analysis[3] reported that engagement in mentally stimulating leisure activities was associated with better processing speed and executive functioning in later life. Regarding the memory domain, we did not find significant effects of chess practice on visual memory. In contrast, Yates et al. [3] reported that regular practice of mentally stimulating activities was related to better memory function. Furthermore, some studies [29,32] have found that more practice with board games was related to an attenuation in memory decline rates, especially in terms of episodic memory [29,32] and working memory.[32,45] Regarding visuospatial abilities, our outcomes were consistent with previous findings on the absence of changes in this domain related to the practice of cognitive activities.[32]

Regarding mood, some studies have reported its positive relationship with the practice of cognitively stimulating activities.[46–48] Lin et al.[46] analyzed the effects of the game GO, a kind of Chinese chess, on depression in people with AD, concluding that an intervention involving the game GO for 6 months ameliorated depressive symptomatology. Engagement with Making Memories Together, a therapeutic board game specifically designed for people with AD, has been shown to be associated with a significant reduction in signs of depression in patients in advanced stages of dementia.[47] However, we cannot draw definitive conclusions from our results since there were differences between the groups before the start of the intervention in terms of the presence of depressive symptoms, which were higher in the control group in both evaluations. The nonrandomized sampling nature of our study could explain this baseline heterogeneity.

Regarding QoL, in addition to the objective improvement measured by the WHOQOL-OLD, it is also worth noting that some social behaviors were observed over the course of chess classes, such as helping each other, socially participating to a greater extent, and creating social ties. These social behaviors derived from the chess intervention program revealed an important factor to consider since previous research has demonstrated that an extensive social network and a socially integrated lifestyle seem to have a protective effect against dementia.[49,50] Additionally, playing face-to-face board games, such as chess, has been demonstrated to be more effective for cognitive function than playing alone.[45] Research on the effects of the practicing cognitively stimulating activities by older people with cognitive impairment or dementia has shown a significant relationship between regularly playing board games and presenting a better QoL.[46] Additionally, a study with healthy older women also showed improvements in their perception of QoL after an intervention program combining chess classes with resistance training.[40]

Finally, it is important to highlight the high level of satisfaction and motivation reported by the participants in the intervention group in the post-evaluation, consistent with the good adherence to the chess program. These results are a helpful indicator of good acceptability and the feasibility of implementing a chess-intervention program in care centers with the same characteristics.

In response to the secondary objective proposed in this study, our results indicated that a chess-training protocol consisting of two weekly sessions of one hour for 12 weeks was effective in improving the cognition and QoL of a sample of institutionalized and semi-institutionalized older people. No existing research has applied a specific chess protocol as an intervention in older adults. Therefore, we recommend our chess-training protocol as a guideline for implementation in all care institutions directed to this sector of the population.

This pilot study includes some limitations that should be taken into account when considering our preliminary results. The assignment of patients based on their preferences restricts the generalization of the findings and may weaken the external validity of the results. Additionally, the sample size was small, including 11 participants in each group. Larger studies with more robust randomized designs are warranted to determine the efficacy of chess-based interventions. The possibility of continuing to play chess and the long-term effects of the program were not assessed. Thus, it would be interesting to conduct follow-up assessments to determine the possibility and the rate of continuation and potential related changes in cognition, mood, and QoL. Finally, the influence of the intervention period on the efficacy of the program should also be further explored.

Despite these limitations, our research also has some strengths. First, we incorporated the evaluation of multiple factors (cognition, mood, and QoL) which allowed us to obtain as much information as possible about the benefits of this type of intervention in senior care centers. Another important strength is that our outcomes have implications for clinical practice since they provide guidelines for professionals to develop an inexpensive and easy-to-implement intervention.

Conclusions

A chess intervention program with 60-minute sessions twice a week for 12 weeks improved general cognitive status, attention, processing speed, executive functions, and QoL in a sample of semi-institutionalized and institutionalized older people. Further research with larger and randomized samples is necessary to provide a more in-depth exploration of the effects of a chess intervention program in older adults with and without cognitive impairment.

Declarations of competing interest

None.

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