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RESEARCH ARTICLE

Cognitive Intervention Techniques Among the Elderly: A Comparative Study

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Abstract: This study, titled "Cognitive Intervention Techniques Among the Elderly: A Comparative Study Using Sudoku and Jenga", aimed to compare the cognitive benefits of Conceptual Jenga and Sudoku in elderly individuals. A total of 30 participants aged above 65 years were recruited through convenience sampling from two old age homes in Chennai and divided into two groups of 15 each. One group engaged in structured Sudoku activities and the other in modified Conceptual Jenga, with each group placed in different settings to avoid contamination. Cognitive functioning was assessed using the Montreal Cognitive Assessment (MoCA) scale before and after a six-week intervention period. The results revealed significant improvements in cognitive function for both groups, with increased MoCA scores observed after the intervention. The findings demonstrate that Sudoku's logical challenges and Conceptual Jenga's integration of motor and cognitive tasks both contributed meaningfully to enhancing cognition among the elderly. The study concludes that incorporating such structured cognitive activities into geriatric care programs can be an effective occupational therapy strategy to promote cognitive vitality and independence in older adults.

Keywords: Elderly, Cognition, Sudoku, Jenga, MoCA, Occupational Therapy.

INTRODUCTION

The rapid growth of the elderly population has drawn increasing attention to the challenges of age-related cognitive decline. Declines in memory, attention, problem-solving, and executive functioning not only affect the ability to manage daily activities but also reduce independence and quality of life. Supporting cognitive health in older adults is therefore essential to promote well-being, maintain autonomy, and reduce caregiver burden. Occupational therapy plays a vital role in this process by engaging individuals in meaningful and stimulating activities that target multiple cognitive domains.

Conceptual Jenga is a modified version of the traditional tower-building game, adapted to suit the needs of elderly individuals. The game uses larger blocks for easier handling and incorporates cognitive tasks linked to colored or labeled blocks, such as memory recall, reasoning, and decision-making. In addition to promoting fine motor coordination and concentration, Conceptual Jenga encourages strategic thinking and problem-solving in a social and engaging format. Its combined physical and mental demands provide a holistic form of stimulation, making it an innovative occupational therapy tool for enhancing cognition in older adults.

Sudoku, by contrast, is a logic-based number placement puzzle that exercises mental processes such as attention, concentration, and problem-solving. Regular practice with Sudoku requires players to recognize patterns, apply logical reasoning, and sustain focus, thereby strengthening memory and executive functions. Its structured and progressively challenging format makes Sudoku a simple yet powerful cognitive activity, well-suited for elderly populations.

By comparing these two interventions, this study seeks to evaluate their relative effectiveness in improving cognitive function among elderly individuals. Both games are inexpensive, engaging, and adaptable, making them promising strategies for occupational therapy practice and geriatric care.

NEED FOR THE STUDY

1.Elderly people often experience cognitive decline due to aging, which can impact their daily functioning and overall well-being.

- Conceptual Jenga could help improve their cognitive abilities by providing a fun and engaging activity.
- Sudoku could help improve their cognitive abilities through its emphasis on logic and problem-solving, which are known to enhance cognitive function in the elderly.

2. Hence this study aimed to compare the effectiveness of Conceptual Jenga and

METHODOLOGY

- **Research Design:** Quasi-experimental study
- **Population:** Elderly individuals residing in old age homes, Chennai
- **Sample Size:** 30 participants (Sudoku group: 15; Jenga group: 15)
- **Sampling Technique:** Convenience sampling

- **Inclusion Criteria:** Age ≥65 years, MoCA <26, ability to understand Tamil
- **Exclusion Criteria:** Severe neurological or motor impairments, developmental disorders
- **Duration:** 6 weeks

ASSESSMENT TOOL

The **Montreal Cognitive Assessment (MoCA)**, developed by Nasreddine et al. (2005), is a brief screening tool designed to detect mild cognitive impairment (MCI) and early dementia. It takes approximately **10 minutes** to administer, with a maximum score of **30 points**; a score of **26 or above** is considered normal.

The **Tamil version of MoCA** was used in this study to ensure cultural and linguistic appropriateness for participants.

MoCA evaluates **eight cognitive domains**:

1. **Visuospatial and Executive Function** – trail making, cube copying, clock drawing.
2. **Naming** – identifying familiar animals.
3. **Attention and Concentration** – digit span, vigilance, serial subtraction.
4. **Language** – sentence repetition, verbal fluency.
5. **Abstraction** – word similarities.
6. **Memory** – immediate and delayed recall of words.
7. **Visuospatial Skills** – assessed through drawing and copying tasks.
8. **Orientation** – awareness of date, time, and place.

PROCEDURE

Permission to conduct the study was obtained from the respective old age homes. Participants were informed about the purpose and objectives of the research, and written informed consent was secured prior to enrollment.

A total of **30 elderly participants** who met the inclusion criteria were recruited. The **Montreal Cognitive Assessment (MoCA) – Tamil version** was used as the primary outcome measure for cognitive function.

Participants were divided into two groups:

- **Sudoku group (n = 15)**
- **Jenga group (n = 15)**

Baseline **pre-test scores** were recorded for both groups using the MoCA scale before the intervention. The Sudoku group was administered structured Sudoku puzzles, while the Jenga group engaged in Conceptual Jenga activities over the 6-week intervention period.

At the end of the intervention, **post-test scores** were collected using the same assessment tool. The pre- and post-test data were subjected to **statistical analysis (paired t-test and independent sample t-test)** to determine the effectiveness of the interventions.

INTERVENTION PROTOCOL

Jenga Intervention:

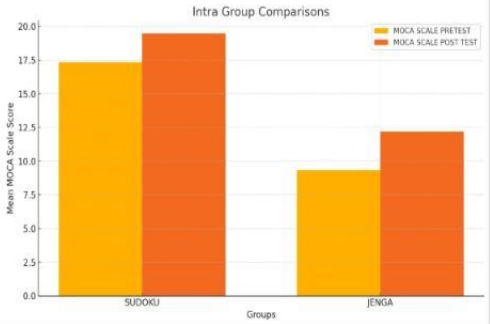
- **Week 1:** Introduction to traditional Jenga – rapport building and familiarization with rules.
- **Week 2:** Conceptual Jenga with color-coded blocks linked to emotions, memories, and activities.
- **Week 3:** Reasoning and memory recall tasks using question blocks.
- **Week 4:** Problem-solving and decision-making scenarios.
- **Week 5:** Assertive thinking tasks.
- **Week 6:** Integration of all task types with reflection and feedback.

Sudoku Intervention:

- **Week 1:** Basic number concepts as preparation.
- **Week 2:** Introduction to 3×3 Sudoku.
- **Week 3:** 4×4 Sudoku puzzles.
- **Week 4:** 6×6 Sudoku puzzles.
- **Week 5:** 8×8 Sudoku puzzles.
- **Week 6:** Continuation with 8×8 puzzles, review, and feedback session.

Intra group comparisons

		Mean	Std. Deviation	P-VALUE
SUDOKU	MOCA SCALE PRETEST	17.33	3.735	<0.001*
	MOCA SCALE POST TEST	19.47	4.470	
JENGA	MOCA SCALE PRETEST	9.33	4.776	<0.001*
	MOCA SCALE POST TEST	12.20	5.294	
		*p-value<0.05 - statistically significant		
	Paired t-test			



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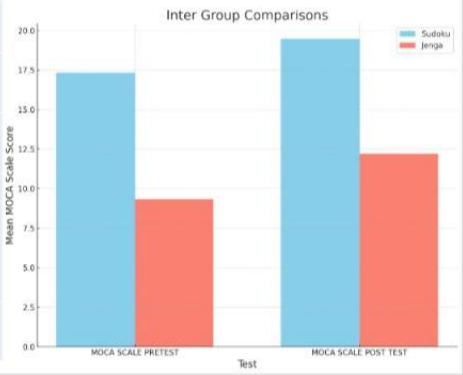
	JENGA	15	12.20	5.294	
			*p-value<0.05 - statistically significant		
		Independent sample t-test			



RESULTS

The study included 30 elderly participants, divided into a Sudoku group (n=15) and a Jenga group (n=15). Pre- and post-intervention MoCA scores showed significant improvement in both groups ($p < 0.001$). The Sudoku group improved from a mean of 17.33 ± 3.73 to 19.47 ± 4.47, while the Jenga group improved from 9.33 ± 4.77 to 12.20 ± 5.29. Although the Sudoku group achieved higher overall scores, the Jenga group demonstrated a greater relative percentage gain (30.8% vs. 12.4%). These findings indicate that both interventions are effective, with Sudoku benefiting those with higher baseline cognition and Jenga producing substantial improvements in individuals with lower baseline function.

CONCLUSION

This study highlights the effectiveness of structured cognitive activities in enhancing cognitive functioning among the elderly. Sudoku was particularly effective for participants with higher initial cognitive performance, reinforcing memory, attention, and problem-solving skills. In contrast, Jenga provided more relative improvement for participants starting at lower cognitive levels, combining physical manipulation with cognitive engagement. Together, these results emphasize the importance of tailoring cognitive interventions in occupational therapy to the baseline abilities of participants, thereby promoting cognitive vitality, independence, and overall well-being in geriatric care.

LIMITATIONS AND RECOMMENDATIONS

LIMITATIONS:

- Limited generalizability due to the specific population of old age home residents
- Gender distribution within the groups.
- Significant baseline differences in cognitive scores.

RECOMMENDATIONS:

- A larger sample size should be considered for future studies.
- Longer duration of intervention could provide more comprehensive results.
- Recruit participants within a specific range of baseline MoCA scores to ensure more comparable groups.
- Consider exploring other cognitive activities that could complement Sudoku and Jenga for enhanced cognitive benefits.
- Future studies could include a broader age range to generalize the findings more widely.
- Investigate the potential long-term effects of these cognitive activities on various cognitive domains

DECLARATION: The authors have no conflict of interest

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