

Effectiveness of an Occupational Therapy Memory Strategy Education Group Intervention on Memory Difficulties and Activities of Daily Living Performance among the Geriatric Population: A Quasi-experimental Study

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ABSTRACT

Introduction: Memory deficits are one of the common indications of cognitive aging, and they are an essential component for completing day-to-day activities in an effective, timely, and safe manner. Disturbances in memory can have a major impact on an individual's performance in all areas of occupation. Memory alterations have a substantial influence on numerous elements of everyday living, including sentiments and conceptions of self, connections with others, participation in Activities of Daily Living (ADL), and engagement in leisure activities.

Aim: To determine the effectiveness of an occupational therapy Memory Strategy Education Group (MSEG) intervention on memory difficulties and its impact on ADL performance among the geriatric population.

Materials and Methods: The present quasi-experimental pre-post-test pilot study was conducted at Department of Occupational Therapy, SRM Institute of Science and Technology, Kattankulathur, Tamil Nadu, India. A total of 10 participants aged 60 years and above were recruited from a community setting through convenience sampling and were divided into an experimental group (n=5) and a control group (n=5). The experimental group participants received MSEG intervention, while the control group participants received conventional occupational therapy memory intervention for three weeks. The Canadian Occupational Performance

Measure (COPM), Contextual Memory Test (CMT), and Functional Independence Measure (FIM) were used to measure occupational performance, memory, and ADL. The outcome measure scores within groups were analysed using the Wilcoxon signed-rank test, and the comparison of outcome measures between the groups was analysed using the Mann-Whitney U test. An alpha level of $p=0.05$ was considered to be statistically significant. Statistical Package for Social Sciences (SPSS) 24.0 version was used to analyse the data.

Results: In the present study, a total of 10 participants from the age group of 60-75 years (mean age=67.4 years) were included, and each group (control and experimental) consisted of five participants (3 males and 2 females). The results showed that there was a significant difference ($p<0.05$) between the post-test scores of the experimental and control groups in COPM-Performance and CMT ($p=0.032$; $p=0.018$, respectively). However, there was no statistically significant difference ($p>0.05$) in the post-test scores of the experimental and control groups in FIM ($p=0.347$). Further analysis revealed a clinically significant difference between the control and experimental groups in post-test scores.

Conclusion: The results of the study concluded that the MSEG intervention is effective in improving memory difficulties in the geriatric population but had a lesser effect on improving ADL performance.

Keywords: Cognitive aging, Elderly, Memory deficit, Memory training

INTRODUCTION

Memory, a cognitive process of storing and retrieving knowledge, is a critical skill for accomplishing everyday tasks in an efficient, timely, and safe manner [1]. Memory changes related to ageing are reduced processing speed, decreased ability to ignore irrelevant information, and diminished use of techniques to enhance learning and memory [2]. In older adults, cognitive decline has a significant impact on their ability to carry out Activities of Daily Living (ADL), resulting in dependency, distress, and a lower quality of life [3].

Disturbances in memory can have a major impact on an individual's performance in all areas of occupation [4]. Memory loss has an impact on the client's occupational role and performance [5]. Cognitive training helps older adults perform better on cognitive tests and in their daily lives. Modern memory training therapies teach memory techniques with the ultimate objective of slowing the pace of age-related cognitive decline and, as a result, improving the capacity of the elderly to live freely in the community [6].

Memory training therapies aim to enhance memory abilities in older individuals with cognitive impairment by teaching various memory

strategies [7]. There are two types of memory strategies: internal and external. Mental encoding and retrieval techniques like rehearsal and visual imagery are examples of internal strategies. External techniques, such as using a calendar or taking notes, are memory aids that support memory function [8]. Remedial and compensatory strategies are the most commonly used memory intervention methods. Remedial methods typically involve cognitive exercises that seek to improve or re-establish memory function [9]. Compensatory techniques involve using external methods or means to work around deficits [4]. Modern memory training programs teach memory concepts and strategies with the goal of reducing age-related memory deficits and enhancing the older adult's ability to live independently in a community [10].

The MSEG intervention can be effective in elderly clients for managing everyday memory difficulties. Memory strategy group-based therapy with an emphasis on daily function is a relatively new approach to care, with very limited published evidence on the feasibility and advantages of this type of group-based intervention [11]. However, the results could not be generalised to the target population due to the lack of a control group in the research design.

The purpose of the current study was to determine the effectiveness of an occupational therapy MSEG intervention among the geriatric population on memory and its impact on ADL performance.

MATERIALS AND METHODS

The present quasi-experimental pre-post-test pilot study was conducted at Department of Occupational Therapy, SRM Institute of Science and Technology, Kattankulathur, Tamil Nadu, India. The participants were explained about the study, and written consent was obtained from each participant. The present study was started after obtaining approval from the Institutional Ethical Committee of SRM Medical College Hospital and Research Centre (Ethical Clearance No: 2081/IEC/2020). Due to the Coronavirus Disease-2019 (COVID-19) pandemic, the intervention provided to both groups was carried out in the primary residence homes.

For present pilot study, 10 elderly individuals aged 60 years and above were recruited through convenience sampling. Data collection was carried out through a door-to-door survey, and based on the results of the initial assessment, participants were selected for the study. These subjects were selected from the Chetpet locality and its surrounding areas.

Inclusion criteria: Individuals older than 60 of either gender, with Mini-mental State Examination (MMSE) [12] scores of 24 and above, and those participants who had adequate English comprehension skills were recruited.

Exclusion criteria: Individuals older than 60 with a history of neurological problems and psychiatric illness were excluded.

Five participants (n=5) were assigned to the experimental group, and five participants (n=5) were assigned to the control group.

Study Procedure

Baseline measures were taken using COPM [13], CMT [14], and FIM [15]. The patients were grouped into experimental (n=5) and control (n=5) groups. Participants in the experimental group received MSEG intervention for three weeks (6 sessions, 2 times a week) with each session lasting for one hour. Participants in the control group received conventional occupational therapy memory intervention for the same duration. After six sessions of therapy, the post-test scores of both groups were assessed again using COPM, CMT, and FIM.

The COPM is a semistructured interview designed by occupational therapists to detect changes in a patient's self-perception of their occupational performance. The patient rates the importance of the problems on a 10-point scale, ranging from not important at all (score 1) to extremely important (score 10). This rating of importance helps prioritise the problems. Scores range from 0 to 10, and the possible range of scores is from 1 to 100 for performance for each of the identified problems [13].

The CMT is a dynamic assessment of recall and awareness of memory capacity used to measure memory complaints. The standard scores are categorised as Within Normal Limits (WNL), suspect, mild/moderate, or severe. Normative values for individuals aged 59 and above are: 146±WNL, 126-145 for suspect, 112-125 for mild, 87-111 for moderate, and 1-86 for severe [14].

The FIM assesses 18 items (13 motor and 5 cognition) in areas of self-care, sphincter control, transfers, locomotion, communication, and social cognition. It is used to measure ADL. The total score for the FIM instrument (the sum of the motor and cognition subscale scores) will be a value between 18 and 126. The score ranges are as follows: 18-30 for Level 1 (total assistance), 31-53 for Level 2 (maximal assistance), 34-71 for Level 3 (moderate assistance), 72-89 for Level 4 (minimal assistance), 90-107 for Level 5 (supervision/setup), 108-119 for Level 6 (modified independence), and 120-126 for Level 7 (complete independence) [15].

Intervention group protocol: During the one-hour session, the first 10 minutes were dedicated to a warm-up session. The participants were asked to read the newspaper and express their views.

The MSEG Intervention is a structured memory program designed to assist individuals with memory impairment in retaining skills and dealing with memory difficulties in their everyday life in a proactive, practical, and individualised manner [11]. Each session of the intervention had specific external and internal strategies in the treatment protocol that participants were made to perform during the sessions.

Session One: Understanding Memory

- Introduction and overview of the program.
- Discussion of ground rules, expectations, and roles.
- Education on the processes involved in the formation of memories.
- Group discussion to share memory difficulties experienced by the participants in their everyday lives.
- Practical exercises on name recall strategies.
- Introduction of an external memory strategy, such as using a calendar.
- Homework provided, with encouragement to consider individual COPM memory goals.

Session Two: Attention

- Education on the importance of attention as a stage in the formation of memories.
- Practical exercises to test and improve sustained and divided attention.
- Introduction of an external memory strategy, such as using a memory notebook.
- Homework assigned to work on attention exercises, active listening work, and continued work on individual COPM memory goals.

Session Three: Short-term Memory

- Education on what short-term memory is, its usefulness, and how to recognise problems with short-term memory.
- Continued education on internal/short-term memory strategies.
- Practical exercises on the chunking strategy to remember a large list of items.
- Practical exercises on the 5W's (who, what, where, why, and when) strategy to aid recall of specific details in a story.
- Introduction of an external memory strategy: "a place for everything, and everything in its place."
- Homework relates to the practicing short-term memory skills taught during the session.
- Review of individual COPM memory goals.

Session Four: Long-term Memory

- Education on long-term memory skills.
- Practical exercises to test recall of previously learned information from sessions 1-3 inclusive to test long-term recall.
- Introduction of an external memory strategy, such as using a pill planner/blister pack for medication management, and practical strategies to remember to take daily medications.
- Review of individual COPM memory goals.

Session Five: Prospective Memory

- Education and discussion on prospective memory skills used in everyday life to aid recall of tasks that require completion in the future.
- Practical exercises to test prospective memory skills and introduction of strategies to help plan and keep track of future events and tasks.
- Introduction of an external memory strategy, such as using sticky notes, reminders, a diary, and a calendar to enhance prospective memory.

Individual COPM memory goals were reviewed during session six of the intervention.

Session Six: Internal and External Strategies

- Education: A full review of all internal and external memory strategies introduced throughout the program.
- Practical: Specific exercises to practice internal memory strategies taught throughout the program.
- Feedback: Participants and their significant others are encouraged to provide feedback on the MSEG program.

Control group protocol: The control group received a conventional occupational therapist-framed memory program for six sessions [16]. This program is commonly used by occupational therapists to treat memory issues. The participants were educated and given practical demonstrations of internal and external strategies that can be used in daily life.

Session One: Education about the memory system and normal aging-related memory decline.

Session Two: Teaching of wordlist learning tasks [16].

Session Three: Education on mnemonic strategies [17].

Session Four: Education on internal strategies. General occupational therapy internal strategies were taught to the participants, such as mental imagery/visualisation, association, and repetition tasks [16].

Session Five: Education on external strategies. General occupational therapy internal and external strategies were taught to the participants, such as using a to-do list and a daily planner [16].

Session Six: Discussion of the internal and external strategies learned, rehearsal of strategies, and feedback.

All tasks and strategies were taught, and participants were asked to demonstrate a few strategies during the session. The intervention group received the standard MSEG protocol, while the control group received a conventional occupational therapy memory program.

STATISTICAL ANALYSIS

A non parametric method was used for the analysis. The scores of the outcome measures within groups were analysed using the Wilcoxon signed-rank test, and the comparison of outcome measures between the groups was analysed using the Mann-Whitney U test. The hypothesis being tested aimed to identify whether there was a statistically significant effect of the treatment being given. An alpha level of $p=0.05$ was considered statistically significant. The data was analysed using SPSS version 24.0.

RESULTS

The above table [Table/Fig-1] depicts the demographic data in terms of age and gender. A total of 10 participants between the ages of 60-75 were included, with each group (control and experimental) consisting of five participants. Each group consisted of three male and two female participants. The results showed that there was no statistically significant difference ($p>0.05$) between the pretest scores of the experimental and control groups in COPM-Performance, CMT, and FIM ($\mu=0.000$, $p=1.000$; $\mu=0.104$, $p=0.917$; $\mu=-0.313$, $p=0.754$, respectively) [Table/Fig-2].

Group	Mean age (67.4 years)	Males	Females
Control group (n=5)	Age group 60-70 - 3 (Participants) Age group 70-75 - 2 (Participants)	3	2
Experimental group (n=5)	Age group 60-70 - 3 (Participants) Age group 70-75 - 2 (Participants)	3	2

[Table/Fig-1]: Demographic distribution of sample population.

The results also showed that there was a significant difference ($p<0.05$) between the post-test scores of the experimental and control groups in COPM-Performance and CMT ($p=0.032^*$; $p=0.018^*$, respectively) [Table/Fig-2]. However, there was no statistically significant difference

($p>0.05$) in the post-test scores of the experimental and control groups in FIM ($p=0.347$) [Table/Fig-3].

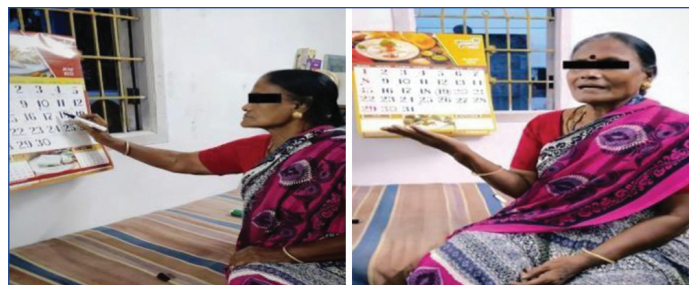
Outcome measures	Group	Mean	SD	μ -value	p-value
Canadian Occupational Performance Measure-P [13]	Control	61.00	9.618	0.000	1.000
	Experimental	61.40	8.264		NS
Contextual Memory Test (CMT) [14]	Control	116.00	13.266	-0.104	0.917
	Experimental	115.40	11.824		NS
Functional Independence Measure (FIM) [15]	Control	101.40	10.597	-0.313	0.754
	Experimental	103.80	8.289		NS

[Table/Fig-2]: Comparison of pretest scores of Canadian Occupational Performance Measure (COPM), Contextual Memory Test (CMT) and Functional Independence Measure (FIM) between control and experimental group. $p\leq 0.05$; SD: Standard deviation

Outcome measures	Group	Mean	Std. Deviation	μ -value	p-value
Canadian occupational performance measure [13]	Control	64.20	9.066	-2.149	0.032* S
	Experimental	70.60	8.961		
Contextual memory test [14]	Control	122.00	12.629	-2.366	0.018* S
	Experimental	133.60	11.610		
Functional independence measure [15]	Control	105.20	10.826	-0.940	0.347 NS
	Experimental	110.20	8.843		

[Table/Fig-3]: Comparison of post-test scores of Canadian Occupational Performance Measure (COPM), Contextual Memory Test (CMT) and Functional Independence Measure (FIM) between control and experimental group. $p\leq 0.05$

In [Table/Fig-4a], the participant is shown using the external memory strategy of using a calendar to mark important dates. In [Table/Fig-4b], the participant is shown performing the name recalling strategy as part of the practical session one in the experimental group protocol.



[Table/Fig-4]: a,b) The performance of participant in experimental group. (Images from left to right)

In [Table/Fig-5a], the participant is practically demonstrating an internal memory strategy such as having a designated place for everything. In [Table/Fig-5b], the participant is demonstrating the internal memory strategy of mental imagery, specifically using visual images to assist with learning and recall.



[Table/Fig-5]: a,b) The performance of participant in control group. (Image from left to right)

DISCUSSION

The pilot study investigated the effectiveness of the occupational therapy MSEG intervention on memory difficulties and ADL performance among the geriatric population. CMT and FIM were used to assess memory and ADL, respectively. The Canadian Occupational Performance Measure (COPM) was used to set client-centered goals and was included as part of the interventional protocol.

The results showed that there was an equal distribution of samples among the groups, with nearly equal mean differences in their COPM, CMT, and FIM scores. This indicates that the groups were homogeneous before the intervention. Post-test scores were compared between the experimental and control groups, revealing a significant improvement in memory aspect in the intervention group. However, there was no significant impact on ADL.

These results are consistent with a previous study conducted on MSEG intervention, which suggested a significant improvement in memory skills and occupational performance after MSEG intervention [11]. A previous study on memory strategy intervention based on the occupational model also supported the efficacy of cognitive intervention and emphasized the occupational therapy perspective in achieving occupational goals and reducing memory-related mistakes in daily life [18].

The present study's results also suggested that memory skills improved with the 3-week intervention, although it had a lesser effect on ADL. These findings align with a previous study on ADL recovery, which stated that ADL recovery is a long-term outcome and sustained long-term intervention would be more beneficial [19].

Limitation(s)

Due to the small sample size and short study duration, the authors were unable to assess the long-term impact of the MSEG intervention. Additionally, the setting of the study was changed from an old age home to the community due to the COVID-19 pandemic.

CONCLUSION(S)

The findings of the study showed that following MSEG intervention in older adults, there was improvement in their day-to-day memory difficulties but less impact on improving performance in ADL. Further analysis revealed an association between memory and the performance of ADL tasks.

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