

Effect of Cognitive Stimulation Therapy versus Reminiscence Therapy on Cognitive and Psychological Outcomes in Older Adults with Mild Cognitive Impairment: A Quasi-Experimental Study

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Abstract

Background: The aging population is the most significant demographic phenomena that the world has seen in recent decades, which in turn resulted in a sharp rise in the number of older people. Consequently, these data anticipate a reduction in expected years of active and healthy life and a rise in age associated with gradual deterioration of physical and mental health. Cognitive frailty is recognized as a precursor to major health conditions. Early identification and cognitive intervention programs can potentially preventing or reversing this decline in cognitive function. **Aim:** This study aimed to evaluate the effectiveness of cognitive stimulation therapy versus reminiscence therapy on cognitive and psychological outcomes in older adults with mild cognitive impairment. **Design:** A Quasi-experimental study was followed to conduct this study. **Setting:** The study was conducted in two elderly clubs namely El- Saada and El- Amal elderly club in Mansoura city. **Subjects:** A total of 60 older adults with mild cognitive impairment were included in the study and randomly assigned to three equal groups; cognitive stimulation therapy group, reminiscence therapy group and control group. **Tools:** The data were collected through demographic and health-related characteristics interview sheet, montreal cognitive assessment, psychological wellbeing scale-18, the satisfaction with life scale and one question to assess participants' satisfaction with the program. **Results:** A significant increase in cognitive function and psychological outcomes were evident among the cognitive stimulation group and reminiscence group after implementation of the intervention when compared to pre intervention and the control group ($p < 0.05$). **Conclusion:** The application of either cognitive stimulation therapy or reminiscence therapy is effective strategy in improving cognitive and psychological outcomes of older adults with mild cognitive impairment. **Recommendation:** The health care providers should be encouraged to incorporate such programs as non-pharmacological interventions in routine care of older adults residing either in the community or institutions to preserve their cognitive and psychological health. **Keywords:** Cognitive stimulation therapy, Reminiscence therapy, Cognitive function, Psychological outcomes, Mild cognitive impairment, Older adults.

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Introduction

The aging population is the most significant demographic phenomena that the world has seen in recent decades. The rapid growth in the elderly population is a result of longer life expectancies. By 2050, the proportion of the global population over 60 will almost double, from 12% to 22%. As a result, this age group will rise from 1 billion in 2020 to 1.4 billion and will double to 2.1

billion by 2050⁽¹⁾. The gradual increase in the numbers of older adults is one of the notable features of the Egyptian population over the last few decades, and this trend is anticipated to persist over the next decades. The percentage is projected to be 8.1% in 2016, and 9.2% in 2021, and it is expected to reach 20.8% in 2050. This means that, around 20 million Egyptians will be categorized as older adults by that time⁽²⁾. Consequently, these data anticipate a reduction in expected years of active and healthy life and a rise in age associated with gradual deterioration of physical and mental health status⁽³⁾.

Aging has been associated with decline in cognitive performance; cognitive function is a broad concept involving mental operation necessary for the acquisition and manipulation of information. It includes different domains such as memory, attention, language, orientation, and executive function. With advanced aging, cognitive functions have some age-related changes that include deterioration in cognitive capabilities, such as short term memory loss, attention span, acquisition of new information, and problem solving. All of these changes can precipitate to mild cognitive impairment^(4,5). People with impaired cognition and reduced cognitive abilities have devastating effect on their quality of life⁽⁴⁾ and psychological wellbeing which incorporates psychological concepts like self acceptance, life satisfaction and social connectedness^(6,7).

In the same context, mild cognitive impairment is increasingly recognized as an important public health challenge associated with aging⁽⁸⁾. Mild cognitive impairment (MCI) is a common condition in older adults that refers to the transitional stage between healthy aging and early dementia characterized by deterioration of memory, attention and other cognitive functions that is not serious enough to interfere with daily activities⁽⁴⁾. According to the most recent meta-analysis of eighty prior researches, the global prevalence of mild cognitive impairment was as high as 41% among adults aged over 50 years across different populations⁽⁹⁾. In Egypt, approximately 32% of community dwelling older adults free from dementia are affected by MCI, advanced age and depression are the main factors associated with the condition⁽¹⁰⁾.

Cognitive ability has been associated with better psychological outcomes measured with concepts as psychological wellbeing and life satisfaction⁽¹¹⁾. People with mild cognitive impairment suffer a reduction in cognitive abilities, resulting in alteration in psychological status in the form of anxiety and depression⁽⁷⁾. Also, psychological wellbeing can preserve and protect brain health in older adults. Higher psychological wellbeing is associated with likelihood of better cognitive health⁽¹²⁾. This indicates the need of psychological interventions for elderly people using a non-pharmacological approach.

Although, Cognitive frailty is recognized as a precursor to major health conditions as increased risk for developing dementia, effective strategies through early identification and non-pharmacological interventions can potentially preventing or reversing this decline in cognitive functions⁽³⁾. Recently, it has been noted that there are insufficient research studies reflect the effect of cognitive interventions on cognitive and psychological outcomes of older adults with mild cognitive impairment. Parallel to this challenge, the maintenance of cognitive health is

relevant as it protecting against cognitive disorders, delaying its onset and preventing dependency and institutionalization of elderly people ⁽¹³⁾. Non-pharmacological therapies such as cognitive stimulation therapy (CST) ^(5, 14-18) and reminiscence therapy (RT) ⁽¹⁹⁻²¹⁾ have been suggested as a highly prioritized step to preserve cognitive function of older adults.

Cognitive stimulation therapy, which is a cognitive-based non-pharmacological intervention, is the most widely used for people with mild cognitive impairment, defined as participation in a series of enjoyable group activities and exercises aimed at improving cognitive, social and psychological function ^(5, 22). In addition, they have the advantage of generating more interest and encouraging more active participation in older adults ⁽²³⁾. According Spector's protocol ⁽¹⁴⁾, CST involves a series of engaging activities conducted for small groups that stimulate memory, thinking, orientation and executive functions through fourteen cognitive stimulation activities sessions. Currently, CST is the only psychosocial intervention recommended by the NICE Guidelines ⁽²⁴⁾. It was used worldwide to intervene cognitive decline in older adults ⁽²²⁾, and has produced benefits immediately after its completion at least, in supporting general cognitive abilities ⁽²⁵⁾.

Reminiscence therapy is one of the popular non-pharmacological interventions that can protect older adults' cognitive and psychological health ⁽¹⁹⁾. Reminiscence therapy is a method of using the memory to protect mental health and improve the quality of life. It is not just to recall the past events or experiences, but it is a structured process of systematically reflecting on one's life with an emphasis on resolving conflicts from the past, finding meaning in one's life and evaluating prior adaptive coping responses ⁽²⁶⁾. Also, RT promotes older adults' identity, self esteem and uniqueness by remembering them with positive life experiences via enjoyable stimulating activities ⁽²⁷⁾. Reminiscence takes places in different forms, such as individual or group sessions ⁽²⁸⁾. Several studies point out the efficacy of reminiscence therapy and highlights its effectiveness in improve cognitive and psychological health in older adults with mild cognitive impairment ⁽¹⁹⁻²¹⁾.

Therefore, it is necessary for the gerontological nurse to address the intervention strategies that can prevent or delay the risk of cognitive decline. Considering this points, the aim of current study was to evaluate the effectiveness of cognitive stimulation therapy versus reminiscence therapy on cognitive and psychological outcomes in older adults with mild cognitive impairment.

Aim of the study

Evaluate the effectiveness of cognitive stimulation therapy versus reminiscence therapy on cognitive and psychological outcomes in older adults with mild cognitive impairment.

Research hypotheses

1. Older adults with mild cognitive impairment who receive cognitive stimulation therapy or reminiscence therapy will exhibit improvement in cognitive and psychological outcomes than those who don't.
2. Older adults with mild cognitive impairment who receive cognitive stimulation therapy will exhibit better improvement in cognitive and psychological outcomes than those who receive reminiscence therapy.

Method

Research Design:

A Quasi-experimental study was followed to conduct this study.

Research Setting:

The study was conducted in two elderly clubs namely El- Saada and El- Amal elderly club in Mansoura city.

Participants:

Older adults attending the study settings were recruited. They were carefully selected according the following criteria: aged 60 years and more, have mild cognitive impairment, assessed as a score equal 18 to 25 points in the Montreal Cognitive Assessment ⁽²⁹⁾ , able to communicate and willing to voluntarily participate in the study. Older adults with sensory impairments or having received similar interventions during the last year were excluded.

Initially, a total of 82 older adults were interviewed for eligibility. After the initial assessment, those who met the inclusion criteria were 60 older adults. Allocation to each group was performed randomly into three equal groups based on a random sequence of letters A, B, and C which were written on small cards and kept in an envelope. At the beginning of each visit to the study settings (elderly clubs), one card would be picked out to identify the time of each group. Accordingly, all eligible participants would be allocated to either cognitive stimulation therapy (CST) group or reminiscence therapy (RT) group or control group. Because of dropouts, this process continued until the required number of each group was achieved. (Figure I)

Sample size calculation:

To ensure statistical power and account for potential dropout, estimation of sample size was performed using the G-Power software to calculate sample size. Estimation based on a previously reported improvement in total cognitive status of an intervention study conducted on elderly population ⁽²⁶⁾. Sixty older adults were needed to achieve 90% statistical power, alpha error level

5% (95% significance), and ratio of sample size of the groups equal 1 (20 participants for each group).

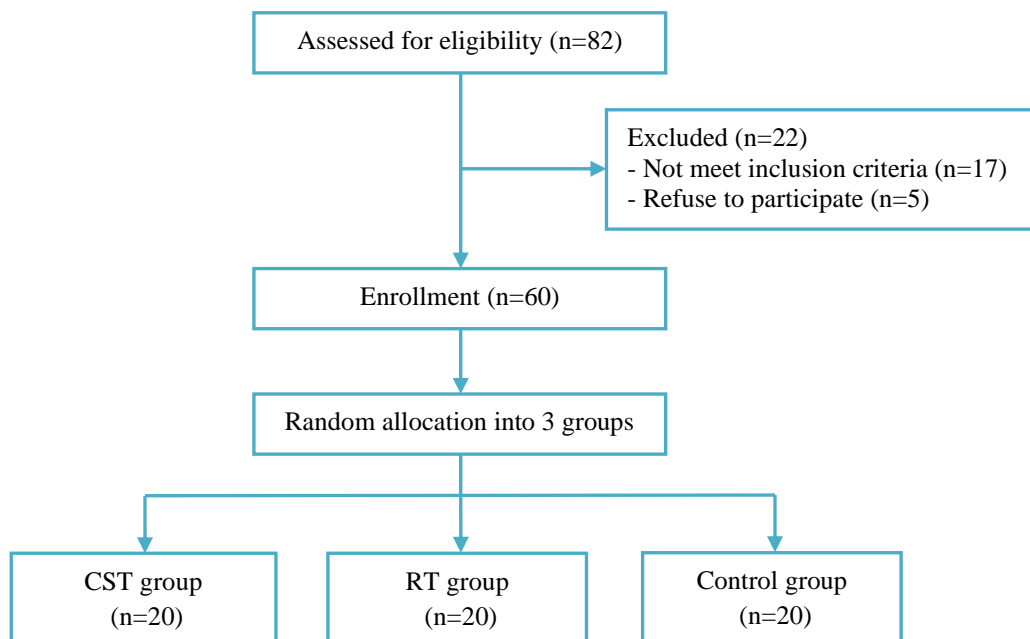


Figure I: Flowchart of the participants enrolled in the study

Data collection tools:

Tools of data collection were categorized as follow:

1. Demographic and health-related characteristics interview sheet:

After reviewing current literature, this tool was designed by the researchers and included two parts:

Part I: Demographic data including age, sex, social status, educational level, residence, income, living arrangement and work before retirement.

Part II: Health-related characteristic including presence of any chronic diseases and its type.

2. Montreal Cognitive Assessment (MoCA)

The Montreal Cognitive Assessment (MoCA) was designed by Nasreddine et al., (2005)⁽²⁹⁾ as a rapid screening tool for mild cognitive dysfunction. It assesses different cognitive domains including executive function, naming, attention, language, abstraction, recall and orientation. The total possible score was 30 points; a score of 26 or above is considered normal, mild cognitive impairment indicated by a score between 18-25 points, moderate cognitive impairment indicated by a score between 10-17 points and sever cognitive impairment indicated by a score less than 10 points.

3. Psychological wellbeing scale – 18 (PWS-18)

The psychological wellbeing was assessed using a revised 18-items version of psychological wellbeing scale developed by Ryff & Keyes, (1995)⁽³⁰⁾. The scale includes 3-items for each of six domains including autonomy, environmental mastery, personal development, positive relations, purpose in life and self-acceptance. Participants were asked to rate each item using a 7-points likert scale ranging from 1 as 'strongly agree' to 7 as 'strongly disagree'. Items that positively worded were reversed, so, higher score indicating higher level of psychological wellbeing. The score of each domain ranged from 3 to 21 and the possible total score ranged from 18 to 126.

4. The Satisfaction with Life Scale (SWLS)

Is a short five-item instrument designed to measure global cognitive judgments of satisfaction with one's life. The queries were answered according to a 7-points likert-type scale, starting from 1 (Strongly Disagree) to 7 (Strongly Agree). The items from the SWLS were summed in order to make a total score. The possible total score were 35. A score of thirty five would indicate high levels of satisfaction with life⁽³¹⁾. This tool was translated into Arabic language and tested for its reliability ($r=0.87$) by El-Gilany and Alam (2017)⁽³²⁾.

5. Program Evaluation

After completion of the program, participants' satisfaction with the program was evaluated by the following single question 'what is your level of satisfaction with the program?'⁽³³⁾. The score was arranged on a scale from 1 to 10. Ten points indicates high level of satisfaction with the program. This question asked only for the CST and RT groups.

Field work and Data collection:

I- Preparation phase

- An approval from the Faculty of Nursing, Mansoura University was issued to the administrative authorities of the selected elderly clubs to conduct the study after being informed about the purpose of the study and the time of data collection.
- After reviewing the current literatures, the study tool 1 (Demographic and health-related characteristics interview sheet) was developed by the researchers.
- The study tool 2 and 3 were translated into Arabic language by the researchers. By an expert in English language, back translation was done to ensure the tools' translation validity.
- Arabic version of tool 4 (The Satisfaction with Life Scale) was used.
- The instructional materials of CST sessions^(5, 14, 15, 17, 34) and RT sessions^(19, 35) were prepared by the researchers based on the recent evidences. To make its material easier for the participants to understand, it was written in straightforward Arabic and included colorful activities. Then the credibility was determined by experts to verify the accuracy and the quality of the content.
- By numbers of experts in the related fields of the study, the study tools were tested for its validity. Accordingly, the required modifications were done.

- The reliability of the study tools 2 (Montreal Cognitive Assessment) and tool 3 (Psychological Wellbeing Scale-18) was tested to ensure internal consistency over repeated administrations. It was confirmed by means of r coefficient ($r=0.83$ and 0.89 respectively).
- A pilot study was conducted on 6 older adults selected from the study setting before beginning of the data collection process to ascertain the applicability and clarity of the study tools. These participants were not included in the study sample.

II- Implementation phase

- Initially, the researchers introduced themselves to the eligible participants, establish good relation and gave them a brief idea about the aim and the benefits of the research to relief their worries and gain their cooperation.
- The researchers conduct individual interviews in the study settings to obtain baseline data related demographics and health-related characteristics from all eligible participants in the three groups of the study.
- Cognitive status, psychological wellbeing and life satisfaction were also assessed just before the intervention to obtain baseline data (pre-test) using the study tools 2, 3, and 4.
- The program was implemented in a safe, quiet and comfortable environment for all participants. Being able to sit in a circle allowed participants to have eye contact with one another, to hear what each person said, and to readily join the conversation whenever they wanted.
- The time suitable for the participants in the study groups were determined and meeting schedule was prepared for each group.
- For each of the three groups in the current study, a specific plan for the program implementation was set as follows:

Cognitive stimulation therapy group

The cognitive stimulation (CS) interventions were implemented to small groups of the participants (3-5 participants in each group) on 14 sessions, held twice a week over a period of seven weeks, with duration of 45-60 minutes for each session. The participants with the same characteristics and interests were put together when creating the groups. The CS sessions were developed as group-based interventions, facilitated by the researchers and offer a sequence of activities that cover the different cognitive domains that aimed to stimulate cognitive functions such as thinking, orientation, memory, calculation, and executive function. These activities were consistent with previous researches especially developed for older adults with cognitive decline^(5, 14, 15, 17, 36). All participants were trained in the same tasks in each session and they were encouraged to seat with different people each session to improve socialization. The CS interventions were implemented in a sequence of sessions presented in (Table I). Each session was organized in the same way. It starts with 10 minutes simple introduction about the session, greeting the participants, and choosing the name for the groups, and ending with session summary and give simple prizes to the participants. During the sessions' conduction, the researchers use printed colored cards with photos, words and markers.

Table I: The sessions of the cognitive stimulation therapy

Week	Sessions	Activities
1 st week	1 Physical games	Initially, educating the participants about the meaning of CS interventions and the aim to be achieved and initiating trustful relationship with the participants. Walking in the garden of the elderly club in teams, balance exercises as walk along a line.
	2 Sounds	Match sound effects with pictures to stimulate the auditory and visual attention of the participants.
2 nd week	3 My life	Participants were asked to fill in the names of themselves, their families and their schools. They enjoy talking and sharing their experiences with old events.
	4 Food	Brainstorm food categories or grouped categories of healthy eating.
3 rd week	5 Current affairs	Find a topic for discussion from the news, newspapers or magazines, and initiate discussion of participants' views or attitudes towards news and events.
	6 Faces and places	Participants were shown pictures of famous people or places to recognize it, and tried to recall names through stimulation.
4 th week	7 Word associations	Complete the sentences, verbal fluency in which participants express many words that begins with the same letter, verbal comprehension exercises in which the participants carry out the instructions verbally, Reading comprehension, word association exercises.
	8 Being creative	Provide a task that everyone can actively participate in, such as cooking, painting, coloring, and decorating.
5 th week	9 Categorizing objects	Brainstorm specific items from specific categories.
	10 Orientation	Discussing the time, day, month, seasons, year and the name and address of the club and their homes.
6 th week	11 Using money	Practical activities aimed at recognizing the value of money such as guess the price, calculate the total price, and match the price to the item in a particular scenario and financial calculations.
	12 Number games	Involving the recognition and use of numbers in different ways.
7 th week	13 Word games	Recognize letters and words correctly, word association exercises, and find the repeated letter in a given words.
	14 Team games	Participants encouraged playing game into small teams such as solving simple puzzles or a trivia game.

Reminiscence therapy group

The researchers conducted the reminiscence therapy (RT) using activities that follow the life span of the participants (e.g., school life, adolescent life, professional life, family relationship, holidays, and historical dates or moments). Such activities allow participants to revive and share life significant moments and integrate them into their autobiographical narrative. Storytelling, watching albums, viewing recorded videos are among the RT activities. The RT was applied for small selected groups with the same characteristics and interests (3-5 participants in each group). It followed the same timeline plan as the CST group, but one session held weekly for seven weeks in the form of 60-90 minutes for each session. The first 15 minutes were dedicated to introduction about the topic of the session. Then, the participants were encouraged to engage in activities or topics that given in each session (childhood, school time, adolescent life, professional life, holidays/travelling, children/grandchildren, and friends and family relationships). They were also encouraged to reflect and share positive memories and achievements on specific issues related to the session topic. This part lasted 40 to 50 minutes and had as main objective to create opportunities for retrieval of autobiographical memories. The last minutes were dedicated for session conclusion

and reward the participants. This intervention was implemented on days other than the days allocated for the CST group. This approach would rule out the possibility of activities disclosure among participants in the study settings.

Control group

The study participants who allocated to the control group received series of recommendations related to their condition aimed at promoting their general health. To comply with the research ethics, at the end of the research, older adults were received condensed one session about the important topics being discussed in the other groups and their questions were answered. Also, the educational booklet was given.

III- Evaluation phase

All the study groups were evaluated immediately after the interventions using the Montreal Cognitive Assessment to assess cognitive status, Psychological Wellbeing Scale-18 to assess psychological status and Satisfaction with Life Scale to assess participants' life satisfaction. Participants' satisfaction with the program was evaluated only for the two intervention groups (CST and RT groups). The researchers conducted the evaluation process individually for each participant. Follow up was conducted three months after the program completion for all the study groups. During this period, the researchers conduct a telephone call to the participants allocated in the two interventions groups as a reminder to follow the program. The study was conducted over a period of 7 months, from the beginning of May to the end of November 2023.

Ethical consideration:

The study was ethically approved by the Research Ethics Committee, Faculty of Nursing, Mansoura University, Egypt, with the reference number [0505]. Following an explanation of the study's nature and its potential benefits, written consent was obtained from the eligible participants. The right to participate or withdraw at any time from the study, as well as, the participants' privacy and data confidentiality were all assured.

Data analysis:

Data were analyzed using Statistical Package for Social Science, Version 20. Whereas categorical data were presented as numbers and percentages, continuous variables were presented as means and standard deviations. The Chi-square test and Fisher's exact test were used for three group comparison in term of baseline demographic and health-related data. The repeated measures ANOVA test was used to compare differences in term of the study outcomes with different measures of the same variable within and between the study groups. Pearson's correlation coefficient was used to test correlation between variables. The significant level was set at 0.05 or less.

Results

Table 1: A total of 60 older adults were enrolled in this study. The study participants' age ranged from 60 to 74 years with a mean age of 64.56 ± 4.66 years, and the age differences between the CST group, RT group and control group were not statistically significant. Female constituted 56.7% of the study participants and 55.0% of them were widows. In term of education, 45.0% had below secondary education, and 31.7% had secondary education and above. Older adults who were

work before retirement represented 66.7%. Of participants, a significant percent (81.7%) were live with their family, and 60.0% reported insufficient income. Most (86.7%) suffered from chronic diseases. Hypertension was the most reported disease by 68.3%, followed by diabetes mellitus (60.0%) and cardiac diseases (43.3%). The analysis of demographic and health-related characteristics confirmed that there were no meaningful variation between the three study groups, indicating that these groups were equivalent without any differences ($p>0.05$).

Table 1: Demographic and health-related characteristics of the study participants

Items	Participants (n=60)				Statistic test	P-value
	Total N=60 (%)	CST group N=20 (%)	RT group N=20 (%)	Control N=20 (%)		
Age (year)						
60-	21 (35.0)	6 (30.0)	8 (40.0)	7 (35.0)	1.196	0.310 ^a
65-	26 (43.3)	9 (45.0)	9 (45.0)	8 (40.0)		
70+	13 (21.7)	5 (25.0)	3 (15.0)	5 (25.0)		
Mean \pm SD	64.56 \pm 4.66	65.1 \pm 3.99	63.7 \pm 4.86	64.9 \pm 3.92		
Sex						
Female	34 (56.7)	11 (55.0)	13 (65.0)	10 (50.0)	1.212	0.545 ^a
Male	26 (43.3)	9 (45.0)	7 (35.0)	10 (50.0)		
Social status						
Widow	33 (55.0)	12 (60.0)	10 (50.0)	11 (55.0)	0.533	0.766 ^b
Married	18 (30.0)	5 (25.0)	7 (35.0)	6 (30.0)		
Divorced	6 (10.0)	2 (10.0)	1 (5.0)	3 (15.0)		
Single	3 (5.0)	1 (5.0)	2 (10.0)	0 (0.0)		
Education						
Illiterate/read & write	14 (23.3)	4 (20.0)	5 (25.0)	5 (25.0)	3.750	0.879 ^b
27 (45.0)	9 (45.0)	10 (50.0)	8 (40.0)			
Below secondary	19 (31.7)	7 (35.0)	5 (25.0)	7 (35.0)		
Secondary and above						
Work before retirement						
Work	40 (66.7)	14 (70.0)	15 (75.0)	11 (55.0)	1.005	0.605 ^a
Not work	20 (33.3)	6 (30.0)	5 (25.0)	9 (45.0)		
Income						
Enough	24 (40.0)	7 (35.0)	9 (45.0)	8 (40.0)	0.196	0.906 ^a
Not enough	36 (60.0)	13 (65.0)	11 (55.5)	12 (60.0)		
Living arrangement						
With family	49 (81.7)	18 (90.0)	15 (75.0)	16 (80.0)	2.078	0.434 ^b
Alone	11 (18.3)	2 (10.0)	5 (25.0)	4 (20.0)		
Presence of chronic diseases						
Yes	52 (86.7)	18 (90.0)	16 (80.0)	18 (90.0)	1.193	0.551 ^b
No	8 (13.3)	2 (10.0)	4 (20.0)	2 (10.0)		
Type of diseases #						
Hypertension	41 (68.3)	16 (80.0)	12 (60.0)	13 (65.0)		
Diabetes Mellitus	36 (60.0)	14 (70.0)	11 (55.0)	11 (55.0)		
Cardiac diseases	26 (43.3)	9 (45.0)	7 (35.0)	10 (50.0)		
Musculoskeletal	23 (38.3)	9 (45.0)	6 (30.0)	8 (40.0)		
GIT diseases	16 (26.7)	7 (35.0)	4 (20.0)	5 (25.0)		

CST: Cognitive Stimulation Therapy, RT: Reminiscence Therapy

Notes: ^a Pearson's chi-square test, ^b Fisher Exact Test, # Multiple responses

Table 2: The results of the repeated measures ANOVA reflect a significant difference in effective of intervention program within the CST group and RT group and between all groups. Overall, the two intervention groups (CST and RT groups) showed more favorable increase in global and all aspects of cognitive status score by Montreal Cognitive Assessment (MoCA) in the different time points of evaluation ($f= 198.8$, $p<0.001$ for CST group and $f= 75.24$, $p<0.001$ for RT group), while, the control group revealed no statistical difference ($p>0.05$). It is also noted that the CST group had relatively better scores of the cognitive function than the RT group when analyzed at different time of evaluation, reflecting the effectiveness of the cognitive stimulation intervention. Furthermore, this table reveals no significant variances between the three study groups pre the interventions ($f= 0.303$, $p=0.740$). However, the variances were statistically significant immediately and three months after the interventions ($p<0.001$), indicating that the both intervention groups have meaningful improvement in cognitive function compared to the control group. This can reflect the effectiveness of both intervention methods.

Table 2: Comparison of mean scores of the cognitive status (MoCA) between the study groups at different time points of evaluation

MoCA subscales	Group	Cognitive status			Test within-Subjects Effects ^a F-Value
		Pre	Post immediately	Follow up	
Visuospatial/Executive	CST group	3.55±0.61	4.05±0.39	4.00±0.36	10.07 (0.001)**
	RT group	3.65±0.58	3.85±0.48	3.95±0.51	5.78 (0.006)*
	Control group	3.50±0.60	3.65±0.58	3.65±0.58	3.35 (0.083)
	<i>F (p-value)^b</i>	0.325 (0.724)	3.784 (0.029)*	5.139 (0.009)*	
Naming	CST group	2.55±0.51	2.95±0.23	2.90±0.39	4.31 (0.021)*
	RT group	2.40±0.56	2.75±0.44	2.90±0.37	12.40 (0.000)**
	Control group	2.45±0.51	2.60±0.51	2.45±0.68	1.54 (0.227)
	<i>F (p-value)^b</i>	0.452 (0.638)	3.701 (0.031)*	6.131 (0.004)*	
Attention	CST group	3.65±0.74	4.25±0.44	4.15±0.51	7.62 (0.001)**
	RT group	3.95±0.68	4.10±0.41	3.95±0.43	6.33 (0.004)*
	Control group	3.45±0.64	3.65±0.54	3.55±0.68	2.11 (0.135)
	<i>F (p-value)^b</i>	2.730 (0.074)	7.221 (0.001)**	8.116 (0.001)**	
Language	CST group	1.90±0.37	2.65±0.51	2.70±0.56	11.26 (0.000)**
	RT group	1.65±0.59	2.55±0.49	2.60±0.48	9.93 (0.000)**
	Control group	1.80±0.52	2.15±0.44	2.20±0.52	3.35 (0.056)
	<i>F (p-value)^b</i>	1.928 (0.155)	6.903 (0.002)*	4.677 (0.012)*	
Abstraction	CST group	1.30±0.47	1.90±0.39	1.85±0.36	4.45 (0.018)*
	RT group	1.15±0.36	1.85±0.48	1.90±0.31	9.32 (0.001)**
	Control group	1.25±0.44	1.40±0.58	1.45±0.53	0.137 (0.873)
	<i>F (p-value)^b</i>	0.535 (0.633)	4.071 (0.022)*	3.219 (0.047)*	
Delayed recall	CST group	3.15±0.36	3.95±0.47	4.10±0.52	7.71 (0.001)**
	RT group	3.25±0.45	3.90±0.66	3.70±0.58	6.98 (0.003)*
	Control group	3.25±0.48	3.35±0.62	3.35±0.60	1.82 (0.176)
	<i>F (p-value)^b</i>	0.919 (0.405)	5.347 (0.007)*	5.098 (0.009)*	
Orientation	CST group	4.20±0.41	4.85±0.41	4.80±0.36	4.31 (0.021)*
	RT group	4.15±0.36	4.75±0.44	4.60±0.52	3.53 (0.046)*
	Control group	4.15±0.69	4.05±0.55	4.35±0.74	1.63 (0.209)
	<i>F (p-value)^b</i>	0.066 (0.936)	16.845 (0.000)**	3.980 (0.024)*	
Global MoCA	CST group	20.25±2.58	24.60±1.89	24.50±1.95	198.8 (0.000)**
	RT group	20.15±1.81	23.75±1.39	23.60±1.82	75.24 (0.000)**
	Control group	19.85±1.66	20.85±1.31	21.00±1.34	11.93 (0.067)
	<i>F (p-value)^b</i>	0.303 (0.740)	38.26 (0.000)**	38.12 (0.000)**	

Notes: * P value <0.05 , ** P value <0.01

^a Repeated Measures ANOVA (F -value) of Mauchly's test of sphericity. Test Within-subjects effects show the effectiveness of program on the participants in all groups over 3 time periods.

^b Repeated Measures ANOVA (F -value). Test Between-subjects effects show the difference in means between groups.

Table 3: The results confirmed that there were no meaningful variation at initial assessment among the three groups in term of psychological wellbeing ($f= 0.249, p=0.781$). Immediately post implementation of the interventions, significant variances in total and all aspects of psychological wellbeing scale was assured among participants in both intervention groups (CST and RT groups) compared to the control group ($f= 31.81, p<0.001$), and this variances was maintained at 3 months follow up ($f= 34.05, p<0.001$). Repeated measures ANOVA within subjects showed significant improvement is psychological wellbeing among the study participants in the CST group and RT group at the different time points of evaluation ($f= 86.11, p<0.001$ and $f= 92.07, p<0.001$ respectively), whereas, the control group revealed no statistical difference ($f= 10.97, p=0.071$), indicating that such improvement not noticed among participants in the control group. For the CST group, the mean score of psychological wellbeing was slightly higher at different time of evaluation than in the RT group, suggesting the effectiveness of the cognitive stimulation intervention in improving the psychological outcomes in older adults with mild cognitive impairment.

Table 3: Comparison of mean scores of the psychological wellbeing (PWS-18) between the study groups at different time points of evaluation

Psychological wellbeing-18 (PWS-18) subscales	Group	Psychological outcomes			Test within-Subjects Effects ^a F-Value
		Mean \pm SD			
		Pre	Post immediately	Follow up	
Autonomy	CST group	13.15 \pm 1.84	16.35 \pm 2.23	16.05 \pm 2.39	16.78 (0.000)**
	RT group	13.05 \pm 1.50	14.95 \pm 2.25	14.80 \pm 2.23	7.65 (0.010)*
	Control group	13.65 \pm 1.93	14.05 \pm 2.17	13.95 \pm 1.99	2.31 (0.114)
	<i>F (p-value)^b</i>	0.447 (0.642)	5.660 (0.006)*	4.861 (0.011)*	
Environmental mastery	CST group	13.70 \pm 1.62	15.75 \pm 1.65	15.90 \pm 1.50	12.85 (0.001)**
	RT group	13.45 \pm 1.31	15.70 \pm 1.83	15.55 \pm 1.95	13.10 (0.001)**
	Control group	13.95 \pm 1.61	14.25 \pm 1.92	14.20 \pm 1.71	1.17 (0.313)
	<i>F (p-value)^b</i>	0.539 (0.586)	4.003 (0.024)*	3.838 (0.051)*	
Personal development	CST group	11.40 \pm 1.60	13.80 \pm 1.71	14.10 \pm 1.96	17.63 (0.000)**
	RT group	11.45 \pm 1.69	13.85 \pm 2.55	13.70 \pm 2.41	27.94 (0.000)**
	Control group	11.35 \pm 1.08	11.85 \pm 0.89	11.95 \pm 0.94	2.98 (0.063)
	<i>F (p-value)^b</i>	0.272 (0.763)	8.304 (0.001)**	9.377 (0.000)**	
Positive relations	CST group	15.50 \pm 1.57	16.75 \pm 1.12	16.65 \pm 0.94	9.65 (0.004)*
	RT group	15.95 \pm 1.27	16.50 \pm 1.43	16.30 \pm 1.26	7.10 (0.007)*
	Control group	14.90 \pm 1.59	15.15 \pm 1.38	15.05 \pm 1.41	1.75 (0.187)
	<i>F (p-value)^b</i>	2.756 (0.072)	9.761 (0.000)**	19.269 (0.000)**	
Purpose in life	CST group	13.65 \pm 1.66	15.35 \pm 1.75	15.15 \pm 1.69	6.54 (0.018)*
	RT group	13.50 \pm 1.46	15.45 \pm 1.59	15.20 \pm 1.41	14.49 (0.001)**
	Control group	13.45 \pm 1.61	13.65 \pm 1.56	13.75 \pm 1.40	2.87 (0.069)
	<i>F (p-value)^b</i>	0.325 (0.734)	9.748 (0.000)**	8.830 (0.000)**	
Self-acceptance	CST group	14.35 \pm 1.59	16.05 \pm 1.81	15.70 \pm 1.44	6.36 (0.019)*
	RT group	13.50 \pm 1.46	16.55 \pm 2.21	16.35 \pm 2.15	25.85 (0.000)**
	Control group	14.25 \pm 1.68	14.15 \pm 1.45	14.35 \pm 1.22	2.67 (0.116)
	<i>F (p-value)^b</i>	1.449 (0.243)	9.378 (0.000)**	5.098 (0.001)**	
Global PWS-18	CST group	81.75 \pm 3.19	94.05 \pm 4.76	93.55 \pm 4.52	86.11 (0.000)**
	RT group	80.95 \pm 3.49	93.00 \pm 5.02	91.90 \pm 4.56	92.07 (0.000)**
	Control group	81.55 \pm 5.19	83.10 \pm 4.89	83.25 \pm 4.44	10.97 (0.071)
	<i>F (p-value)^b</i>	0.249 (0.781)	31.81 (0.000)**	34.05 (0.000)**	

Notes: * *P* value <0.05, ** *P* value <0.01

^a Repeated Measures ANOVA (*F*-value) of Mauchly's test of sphericity. Test Within-subjects effects show the effectiveness of program on the participants in all groups over 3 time periods.

^b Repeated Measures ANOVA (*F*-value). Test Between-subjects effects show the difference in means between groups.

Figure 1: For the CST group, the initial assessment of life satisfaction score was 20.95 ± 2.53 and increased significantly to 24.45 ± 2.66 immediately after the intervention and to 23.95 ± 1.91 at 3 months follow up ($p < 0.001$). Also, for the RT group, the life satisfaction score was 20.15 ± 1.63 at baseline and increased to 23.15 ± 1.95 immediately after the intervention and to 23.05 ± 1.62 at follow up ($p < 0.001$). Otherwise, the life satisfaction score remains mainly constant at different time points of evaluation ($p > 0.05$). Moreover, ANOVA between subjects exhibits no variances between the three groups before the intervention ($p = 0.222$), however, the variances were statistically significant immediately and three months after the interventions ($p = 0.001$, $p = 0.017$ respectively), indicating that the two intervention groups exhibited a better improvement in life satisfaction compared to the control group. (Some data not presented in the figure).

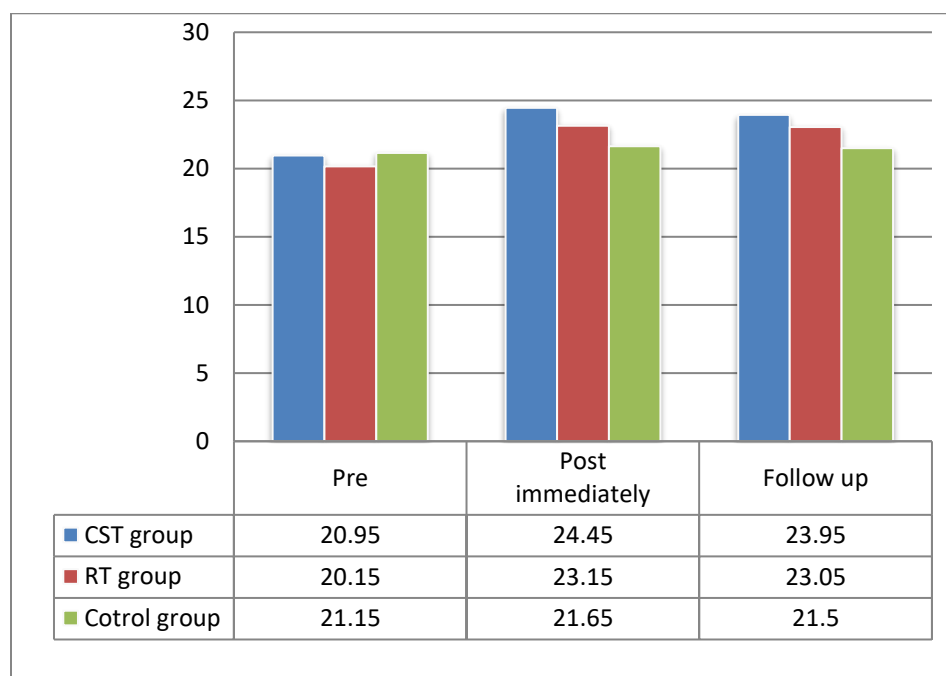


Figure 1: Comparison of mean scores of the life satisfaction between the study groups at different time points of evaluation

Figure 2: This figure represented a high level of satisfaction with the program in both intervention groups with a mean score of 8.3 ± 1.23 for the CST group and 7.9 ± 0.87 for the RT group. The participants' satisfaction with the program reflects the applicability and usefulness of these interventions for older adults with mild cognitive impairment. (Some data not presented in the figure).

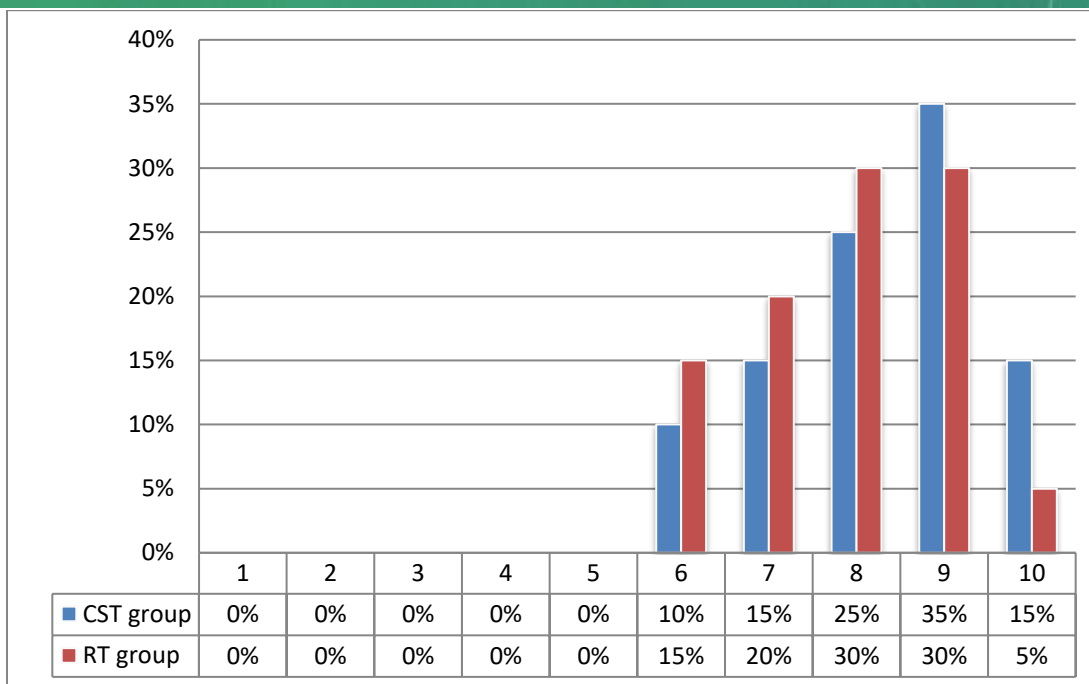


Figure 2: Percentage of the CST group and RT group according to their level of satisfaction with the program

Table 4: Correlation between the different study variables after the program of the two intervention groups

Variables		CST group			RT group		
		MoCA	PWS	Life satisfaction	MoCA	PWS	Life satisfaction
MoCA	r	1.000			1.000		
	p	----			----		
PWS	r	0.731	1.000		0.539	1.000	
	p	0.001	---		0.012	----	
Life satisfaction	r	0.123	0.695	1.000	0.186	0.651	1.000
	p	0.606	0.001	----	0.433	0.003	----

Note: Significant p value (≤ 0.05) is bolded, r: Pearson correlation coefficient

Table 4: Correlation analysis for the CST group revealed a strong positive association between cognitive function and psychological wellbeing ($r=0.731$), and moderate positive association between psychological wellbeing and life satisfaction ($r=0.695$). For the RT group, a significant moderate correlation was noted between cognitive function and psychological wellbeing ($r=0.539$), and between psychological wellbeing and life satisfaction ($r=0.651$). This means that participants with high level of cognitive function had high level of psychological wellbeing and psychological wellbeing was better among those who satisfied with their life.

Discussion

Cognitive frailty is recognized as a precursor to major health conditions. With older adults, early identification and cognitive intervention programs can potentially preventing or reversing this decline in cognitive function⁽³⁾. Recently, it has been noted that there are insufficient research studies reflect the effect of cognitive intervention on cognitive function of older adults with mild cognitive impairment. The literature suggests that early implementation of non-pharmacologic interventions such as cognitive stimulation therapy (CST) and reminiscence therapy (RT) can preserve cognitive function of older adults^(16, 36). In this regard, the aim of the current study was to determine the effect of cognitive stimulation therapy versus reminiscence therapy on cognitive and psychological outcomes in older adults with mild cognitive impairment.

The existing study's findings confirmed our expectations, as it was noted that the cognitive stimulation therapy and reminiscence therapy is highly effective strategies for improving cognitive and psychological outcomes in older adults with mild cognitive impairment. Interestingly, older adults who engaged in the CST program evidenced a relatively higher improvement than those in the RT program. These findings attest to the study's accomplishment of its goal and demonstrate the effectiveness and pertinence of the interventions.

According to the interpretation of the study findings, a considerable number of the study participants experienced several life challenges, such as widowhood, insufficient income, low education, and chronic illness, which may have a detrimental effect on their cognitive and psychological health. These findings are supported by other studies^(37, 38).

With regards to the cognitive stimulation intervention, the results of the repeated measures ANOVA reflect a more favorable increase in global and all aspects of cognitive status score within the CST group at different time points of evaluation and also when compared to the control group, reflecting the effectiveness of the cognitive stimulation intervention in improving the cognitive function in mild cognitive impaired elders. This finding could be attributed to CST relies on a variety of activities which enhancing orientation, thinking, concentration and memory skills, that in turn can stimulate and improve cognitive function. In the same line with our findings, randomized controlled trials conducted on mild cognitive impaired older adults in Portugal and Spain revealed the effectiveness of cognitive training in cognitive function improvement^(15, 16). Also, Sun & Shang, (2021)⁽³⁹⁾ in china noted that early nursing intervention including intellectual training for elders with mild cognitive impairment effectively improve cognitive functions of participants. Moreover, several studies supported our results^(3, 17, 22, 40, 41). Contradictory, findings were reported in another study conducted in USA by Miller et al., (2018)⁽⁴²⁾, who stated no improvement in cognitive abilities after the program and recommended further studies to clarify the potential cognitive benefits after training in that population. This difference may probably due to variation in nature of the program and demographic background of study participants.

Recent systematic review emphasized the cognitive stimulation and psychological outcomes in older adults ⁽²²⁾. Accordingly, the current study findings noted a positive effect of CST on psychological outcomes naming psychological wellbeing and life satisfaction among the study participants. This indicated that psychological wellbeing and life satisfaction score improved significantly following the program at different time points compared to the control group, reflecting the ongoing effectiveness of the program. These positive outcomes might be related to participants have chance to interaction in groups and express their feelings during the program sessions, contributing to increase their sense of psychological wellbeing and satisfied life through such interactions. Another explanation, the improved cognitive ability of the study participants could positively affect their psychological outcomes, as confirmed by the results of the current study which showed a moderate to strong positive association between cognitive function and both psychological wellbeing and life satisfaction. Our explanation supported by other studies ^(6, 43).

In the same context, there were evidences that supporting the efficacy of CST on psychological outcomes in older adults with MCI such as, study conducted in Spain by Carcelén-Fraile et al., (2022) ⁽⁷⁾ concluded that the cognitive stimulation program for 12 weeks can improve cognitive performance, and psychological status of patients with mild cognitive impairment. Moreover, Carballo-Garcia et al., (2013) ⁽⁴⁴⁾ in Spain and Carbone et al., (2021) ⁽¹⁷⁾ in Italy confirmed the positive effectiveness of CST in cognitive and emotional functioning. However, Apostolo et al., (2014) ⁽¹⁵⁾ in Portugal noted no statistical evidence of CST effectiveness on depression symptoms. Variation of sessions, insufficient group interactions and absence of involvement in entertaining activities among the study participants are among justifies achieving the desired outcomes.

Based on the study findings concerning the effect of reminiscence therapy on the cognitive and psychological outcomes in mild cognitive impaired older adults, it was found a significant improvement in such outcomes at different time points of evaluation within group and when compared to the control group, reflecting the efficacy of the RT program on improving the cognitive and psychological outcomes among the study participants with mild cognitive impairment. These findings are likely explained by the fact that the study participants in RT group were encouraged to talk about their memories to others during the sessions, and they exploit any opportunity allows them to interact with others and express feelings. Further, RT had a positive effect on feeling of accomplishment, thus effectively improve cognitive and psychological outcomes. In accordance with these findings, studies conducted in Egypt by Saleh & Salama, (2016) ⁽³⁷⁾ and Abd El Fatah et al., (2024) ⁽³⁸⁾ revealed the effectiveness of RT among older adults. In addition, Bansal & Gill (2018) ⁽²⁶⁾ in india and Gil et al., (2019) ⁽²⁷⁾ in Portugal also showed the potential efficacy of RT for maintaining cognition in the target population. Moreover, these findings correlate with other studies ^(20, 45).

Worthwhile, the main objective of the current study was to analyze the effectiveness of CST versus RT on cognitive and psychological outcomes in older adults with mild cognitive

impairment. In this respect, this study showed a relatively higher efficacy of CST than RT on improving cognitive and psychological outcomes in mild cognitive impaired older adults, as the CST group exhibited slightly higher scores of all study outcomes than the RT group at different time points of evaluation. But, these variances between the two intervention groups were not considerable when compared to the control group. These findings are attributed to the fact that cognitive training program was designed based on many activities that enhance cognitive functions such as reality orientation, thinking and attention that motivate the participants to achieve the task, not just as talking about memories to others during the sessions, making this more effective. This finding highlights the importance of applying the cognitive training activities in early aging, thereby enhancing its beneficial effect in preventing cognitive decline. This finding is reinforced by other researches, as showed the efficacy of cognitive training than reminiscence therapy on improving cognitive function ^(28, 46). While, Zhao et al., (2018) ⁽⁴⁷⁾ and Gil et al., (2022) ⁽³⁶⁾ contradict our results and revealed the effectiveness of reminiscence therapy than the traditional cognitive stimulation program.

Pointed to elders' satisfaction with the program, the results showed a high level of satisfaction in both intervention groups, indicating high satisfaction with the new experiences, applicability and usefulness of these interventions for older adults with mild cognitive impairment. Along the same line, Nebot et al., (2022) ⁽³³⁾ supported our results.

Nonetheless, to the best of our knowledge, this study was the first in Egypt to evaluate the effectiveness of cognitive stimulation therapy versus reminiscence therapy on cognitive and psychological outcomes in older adults with mild cognitive impairment.

According the findings of the present study, the research hypothesis was proved as participants who receive either cognitive stimulation therapy or reminiscence therapy exhibited improvement in their cognitive and psychological outcomes than those who don't. Therefore, CST or RT seems to be appropriate non-pharmacological interventions aimed at preserving cognitive function in community dwelling older adults.

Conclusion

The application of either cognitive stimulation therapy or reminiscence therapy is effective strategy in improving cognitive and psychological outcomes of older adults with mild cognitive impairment. Interestingly, these findings evidenced a relatively efficacy of cognitive stimulation therapy than reminiscence therapy. Moreover, these findings attest to the study's accomplishment of its objective and prove the effectiveness of the interventions.

Recommendations

- The health care providers should be encouraged to incorporate such programs (cognitive stimulation therapy and reminiscence therapy) as non-pharmacological interventions in routine

care of older adults residing either in the community or institutions to preserve their cognitive and psychological health.

- Further researches in this regard should be considered with large samples to validate the findings in order to increase the possibility of generalizing the results to the studied population.
- Future researches are required to assess the factors that make CST more effective than RT in improving cognitive and psychological outcomes in older adults with mild cognitive impairment.

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