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ORIGINAL ARTICLE

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Effects of the cognitive stimulation therapy based on Roy's adaptation model on Alzheimer's patients' cognitive functions, coping-adaptation skills, and quality of life: A randomized controlled trial

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Abstract

Purpose: This study aims to specify the effects of Cognitive Stimulation Therapy based on Roy's adaptation model (RAM) on Alzheimer's patients' coping and adaptation skills, cognitive functions, and quality of life (QOL).

Design and methods: This is an experimental and randomized controlled trial. Patients in the experimental group received cognitive stimulation therapy (CST) based on RAM.

Findings: The cognitive function level of the experimental group was found to be higher than that of the control group at the end of the measurements (performed in the 7th week); the difference was found to be statistically significant ($P < .05$). In the experimental group, dimensions of troubleshooting and focusing, making physical decisions, attention processing, systematizing, learning, and establishing relationships were found to be better than those of the control group after the application, and the difference was found to be statistically significant ($P < .05$). However, after the application, QOL of the experimental group was found to be better than that of the control group following the measurements; the difference was found to be statistically significant ($P < .05$).

Practice implications: Psychiatric nurses should evaluate the patients using Standardize Mini-Mental Test Examination before applying RAM-based CST, and they should apply CST to early- and mid-stage Alzheimer's disease (AD) patients at the end of the evaluation and work with groups consisting of six persons at most. Since the cognitive functions of individuals with AD decline from the first stage, coping-adaptation, and QOL levels will also be affected, so it is recommended to evaluate the cognitive functions, coping-adjustment and QOL levels of individuals before applying RAM-based CST. Trial registration number: NCT02229474

KEYWORDS

Alzheimer, cognitive stimulation therapy (CST), psychiatric nursing, Roy's adaptation theory

1 | INTRODUCTION

Alzheimer's disease (AD) presents initially as progressive losses in one, or more than one, a cognitive domain such as memory, language, visual-spatial skills, and executive functions. It develops into a brain disease that prevents the patient from performing his/her daily activities as previously, and behavioral problems begin to occur after a time.[1,2] Both incidence and prevalence increase with age. Thus, AD is considered a significant public health problem because the elderly population is growing gradually.[3,4] Dementia is a challenging process causing continuous changes for the patients, thereby affecting family members and caregivers because it is progressive.[5] It also causes psychological and physiological problems such as higher stress levels, uneasiness, anxiety, depression, and social isolation for caregivers because they spend most of their time with their Alzheimer's patients.[6]

1.1 | Roy's adaptation model

Roy suggests that disease is inevitable in a person's life and adaptation to disease is related to coping skills and the characteristics of the environmental changes. Roy defines nursing as "the procedures for enhancing the adaptation in health and disease."[7] The basic term in RAM is adaptation: the adaptation domains defined in the model are physiological domains, self-concept, role function, and mutual attachment.[8] The adaptation level is the ability to give positive responses to stimulants, rated as conciliatory, balancing, and great adaptation. In addition, the adaptation level is managed by coping mechanisms and control processes. Roy specifies the coping mechanisms as regulatory and cognitive-affective coping skills. The RAM indicates that adaptive and nonadaptive behaviors of a person arise from the coping mechanisms. Adaptation behaviors represent the ability to give positive responses to the stimulants.[5]

According to Roy, disease is inevitable in individuals' lives. The level of compliance is the individual's ability to respond positively to stimuli. The level of fit in the model; compromise, balancing, and perfect harmony. Moreover, the level of adjustment is regulated by the coping mechanisms and control process of the individual. Roy divides the coping mechanisms into regulatory and cognitive-affective coping. The result of coping mechanisms according to the model is the harmonious and incompatible behaviors of individuals. Adaptive behavior reflects the ability to respond positively to stimuli.[7,8]

This model has been applied in many groups, including hemodialysis patients, pregnant and postpartum women, cancer patients, women who have had a mastectomy operation, acute myocardial infarction patients, congenital cardiac failure patients, lung cancer patients, persons addicted to smoking, bulimia nervosa patients, and children with asthma. The authors of published studies have reported that this model enhanced the effect of nursing care and facilitated the management of the care. In Roy's adaptation model (RAM), changes in the physiological, self-concept, role function, and interdependence areas of individuals were evaluated and nursing care levels were increased.[9–14]

As Alzheimer's progresses, the individual's adaptation to the disease and the environment gradually decreases.[6] In particular, individuals cannot adapt to the newly developing problems as a result of different parts of the brain being affected during the transition between phases and cannot cope with the current situation. Therefore, their adaptation to the disease process deteriorates.[15] Early diagnosis of dementia and knowing which areas of adjustment of the individual are impaired is very important in nursing care. The aim of the nurse while providing care to the person with dementia is to help the individual adapt to changes in health and illness. To do this, the nurse should know what needs the patient is causing the problem and how the patient can adapt to the situation (Figure 1).

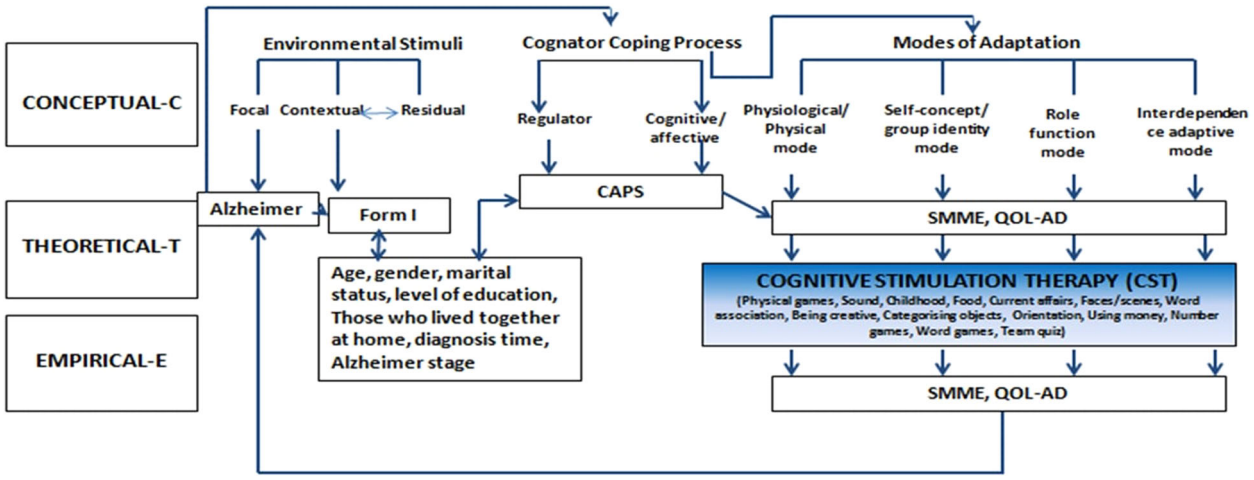

FIGURE 1 Conceptual, theoretical, and experimental frame of the study. CAPS, Coping and Adaptation Processing Scale; QOL-AD, Alzheimer's Disease Patients' Quality Of Life Scale; SMME, Standardized Mini-Mental State Examination [Color figure can be viewed at wileyonlinelibrary.com]

2 | BACKGROUND

AD is neurodegenerative, and its prevalence increases with age. AD is the most common reason for dementia syndrome.[16] The first and most-damaged cognitive domain is the short-term memory. In the further stages of the disease, deteriorations in language functions (word-finding difficulties, paraphasia, and others), in place-time-person orientation and executive functions, losses in visual-spatial skills, and behavioral disorders accompany the short-term memory loss. Losses in short-term memory stand out, although different disorders are seen in various cognitive domains as time progresses. Losses also occur in the long-term memory, and what's learned first is memorized last. Behavioral changes such as agitation, depression, delusions, and hallucinations occur in the intermediary stage of the disease. However, these symptoms may occur during any period of the disease.[17–19] Medical treatment of AD should be initiated as soon as possible, and supportive care should be provided as a supplement to medical treatment in the early stages. Because the stages of AD can progress rapidly, the aim of the treatment should be to shorten the duration of the transition between AD stages.[20,21]

In addition to medical treatment, psychosocial procedures are used to ensure that patients regain the adaptation that is deteriorating along with disease progression. Psychosocial procedures enhance cognitive activities and are categorized as behavioral, emotional, perceptive, and cognition-based procedures.[1,22] The most up-to-date and common cognitive and stimulation-based treatment is cognitive stimulation therapy (CST),[1,16] which consists of 14 sessions (7 weeks, two sessions per week) and aims to enhance the cognitive functions of dementia patients. CST[23] is a model that is based on the theories and evidence in the Cochrane Review of Reality Orientation database and was put into practice. CST is equally effective as several dementia drugs.[24–26] Further, CST led to significant improvements in quality of life (QOL), as rated by the participants themselves using the Alzheimer's Disease Patients' Quality Of Life Scale (QOL-AD).[27] There were no reported side-effects of CST.[28,29]

CST is a treatment method for patients with early and mid-stage dementia. Patients with any early and mid-stage dementia can be grouped and can benefit from CST.[29,30] CST helps the patients with dementia in that it enhances the memory and ensures sustainability, enhances coping and adaptation skills facilitates communication, decreases anxiety and depression, and enhances their QOL.[16,27,31]

Diagnosing the disease in the early stages, specifying in which functions and skills deteriorations occur, and ensuring that the patient regains his/her deteriorated adaptive skills are important for providing nursing care. While providing care for the AD patients, nurses aim to help the patients regain their adaptation to the changes in their health and disease stages. Thus, a nurse should know which needs of the patient cause problems and how patients can adapt to this situation.[7,8] Changes in the cognitive domains of older persons cause problems for them when they perform their daily routines.[32,33] Therefore, it is suggested that when compared to RAM, CST will be more effective in helping elderly persons with cognitive deterioration regain their adaptations to their situation.

3 | STUDY

3.1 | Aims

This study aims to specify the effects of RAM-based CST, which is to be applied as a nursing procedure to enhance AD patients' deteriorated cognitive functions, coping and adaptation skills, and QOL on AD patients' cognitive functions, coping and adaptation skills, and QOL.

3.2 | Hypotheses

- H1: Cognitive level score average of AD patients who received RAM-based CST are better than those of the control group.
- H2: Coping and adaptation scale score average of AD patients who received RAM-based CST are better than those of the control group.
- H3: Quality of life of AD patients scale score average who received RAM-based CST is better than those of the control group.

3.3 | Design

This is an experimental and randomized control trial with pretest and posttest design and two groups. Figure 2 represents the Consolidated Standards of Reporting Trials of this study.

3.4 | Participants

Participants of the study were selected in the Neurology Polyclinic of Akdeniz University Hospital in April 2015. The study was applied in the Social and Healthy Life Association.

3.4.1 | Inclusion

Among the inclusion criteria are: being at least an elementary school graduate, being diagnosed with typical AD in accordance with International Working Group-2 diagnosis criteria, receiving a score between 13 and 24 from Standardized Mini-Mental State Examination (SMMSE) applied in the polyclinic, continuous treatment with acetylcholinesterase inhibitors, and residing in the central districts of Antalya (Muratpaşa, Konyaaltı, Kepez, Döşemealtı, Aksu).

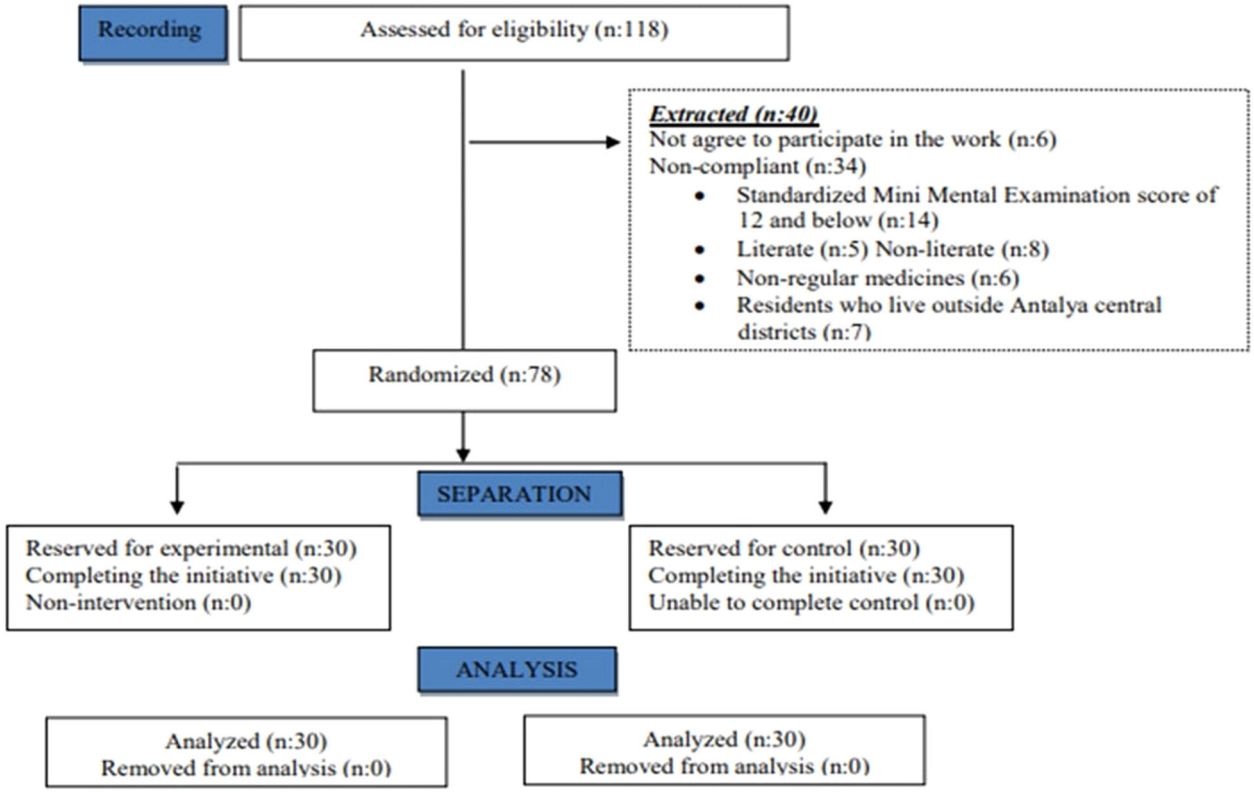

FIGURE 2 Schema off the Consolidated Standards of Reporting Trials [Color figure can be viewed at wileyonlinelibrary.com]

3.4.2 | Exclusion

Persons who participated in a similar program but did not participate in at least two CST sessions were illiterate and were diagnosed with other types of dementia.

3.5 | Sample size

The study population consisted of patients who had been diagnosed with AD and were monitored at the Neurology Polyclinic of Akdeniz University Hospital. Cohen's *d* (0.80),[34] power value (0.80), and type 1 margin of error (0.05) were used to calculate the sample of this study; the sample size was found to be 52 for both groups. It was decided that a total of 60 patients (30, each from both experimental and control groups) would be included.

3.6 | Randomization

In total, 78 patients fitting the study criteria were selected after examining the files of 118 patients being monitored in the polyclinic. Numbers ranging from 1 and 78 were assigned to the patients who were randomly divided into experimental and control groups on an electronic environment, each group having 60 patients. Individuals were appointed to the experimental and control groups through simple randomization using the program. Files of Alzheimer-type dementia patients were obtained from the neurology polyclinic and separated by the researcher considering the inclusion and exclusion criteria (Figure 2).

3.7 | Intervention

The experimental group was treated using RAM-based CST, and routine treatment (monthly polyclinic monitoring) was provided to the control group.

3.8 | RAM-based CST was developed in three stages

3.8.1 | First stage

Content validity of RAM-based CST

To ensure the content validity of RAM-based CST, notifications were sent via e-mail to four lecturers (Department of Psychiatric Nursing [2], Internal Medicine Nursing [1], and Surgical Nursing [1]) who had previously worked with RAM and who were consulted about their opinions. RAM-based CST was revised with expert opinions in mind, translated into English, and sent to SC Roy via e-mail. Afterward, CST was finalized considering Roy's comment.

3.8.2 | Second stage

In the second stage of the study, 78 patients selected in accordance with the inclusion and exclusion criteria were invited to participate. Patients and their relatives were informed about the study. Patients who were assigned to the groups were visited in their homes. The application plan was explained to the patients and their relatives. Then, 30 patients assigned to the experimental group were separated into five equal groups. The experimental group was divided into six groups of five persons. The therapy was completed in 7 weeks with two sessions per week. Therefore, the first three groups received therapy on Monday and Thursday and the other two groups on Tuesday and Friday.

3.8.3 | Third stage

In this stage, RAM-based CST was applied to the experimental group by the first author. CST consisted of 14 sessions with different themes (Table 1). The sessions lasted 45 minutes. The introduction, activity, and final sessions lasted 10, 25, and

TABLE 1 Methods contributing to the adaptation in RAM-based CST

CST session: Titles	Methods to enhance the adaptation	Affected RAM domains Measurement tool
Session 1: Physical games	The nurse encourages the patients to introduce themselves to the group, mention their favorite team, meal, color, and so forth. Supporting the self-perception and playing basketball are also included.	Physiological and self-perception domain CAPS, QOL-AD
Session 2: Sounds	Matching the sounds (of creatures, objects, and so forth) with the relevant photographs, singing a song with or without anybody, moving with the beat of an instrumental using an object (fork, spoon, etc)	Self-perception domain SMME, CAPS, QOL-AD
Session 3: Childhood	Remembering the characteristics, moments, foods and games in childhood, encouraging the patients to talk, draw.	Self-perception domain, mutual attachment domain SMME, CAPS
Session 4: Food	Tasting and remembering foods with different tastes (eg, jam, bread, chocolate, olive, cheese, paste, yogurt), completing the food names, categorizing the foods, creating new names for foods.	Self-perception domain, Role function domain SMME, CAPS
Session 5: Current affairs	Making comments on the news in the newspapers, stating opinions, making comments on predetermined questions covering up-to-date issues (eg, Do women and men have different roles in society?).	Self-perception domain, Role function domain SMME, CAPS
Session 6: Faces/scenes	Remembering the photographs of celebrities, archeological sites and historical places, making assessment about the photographs (who is older or where would you like to be?); Creating a moment relevant to the photographs and sharing this moment with the group.	Self-perception domain, Mutual attachment domain SMME, CAPS
Session 7: Word association	Completing the words (places, proverbs, celebrities, words indicating quantities, and so forth), and lyrics and melody of a song.	Self-perception domain, Role function domain SMME, CAPS
Session 8: Being creative	Washing, peeling, chopping, mixing, and serving a fruit, making leaf prints, planting flowers in a pot.	Self-perception domain, Role function domain CAPS, QOL-AD
Session 9: Categorizing objects	Estimating the names in a certain category (eg, male names starting with A), writing on a board, categorizing the pictures in different categories by their colors, areas of usage, initials, and so forth.	Self-perception domain, Role function domain SMME
Session 10: Orientation	Asking questions to ensure orientation (categorizing by their colors, areas of usage, initials, etc), discussing on the old and new pictures of where they live or lived, asking questions about where they traveled.	Physiological and self-perception domain SMME, CAPS, QOL-AD
Session 11: Using money	Estimating, reasoning, calculating and comparing the real and up-to-date prices of things (fruits, vegetables, beverages, stationery equipment, valuable objects, etc) to the old figures.	Self-perception domain, Role function domain SMME, QOL-AD
Session 12: Number games	Playing tombola, cards, estimating the card numbers, estimating the total sum of the money in a jar.	Physiological domain, self-perception domain, Role function domain SMME, CAPS
Session 13: Word games	Playing hangman, doing puzzles.	Self-perception domain, Role function domain SMME, CAPS
Session 14: Team quiz	Playing football, rewarding the winning team.	Physiological and self-perception domain SMME, CAPS

Abbreviations: CAPS, Coping and Adaptation Processing Scale; CST, cognitive stimulation therapy; QOL-AD, Alzheimer's Disease Patients' Quality Of Life Scale; RAM, Roy's adaptation model; SMME, Standardized Mini-Mental State Examination.

10 minutes, respectively. The therapy was conducted for 7 weeks (two sessions per week for both groups). Patients were transported to the Social and Healthy Life Association using the service vehicle and were taken back to their homes at the end of each session (Table 1).

The sessions provided an educational environment with patients' active participation and enabled them to share personal and social interests. Cognitive stimulation was performed for AD patients, and they were assisted in enhancing their cognitive skills and functions.[1,2] Activities to be performed in the sessions were selected in relation to all adaptation domains in RAM to enhance the adaptation. Activities determined from CST sessions Suitable for four adaptive domains of RAM. The mean scores of participants in the experimental group obtained in the sessions were found to increase weekly. RAM-based CST sessions lasting 45 minutes on average were conducted in the experimental group for 7 weeks (2 days a week). Measurement procedures were applied to the experimental and control group, and the last test data were collected using the measurement tools.

3.9 | Control group conditions

Informed consent indicating that patients volunteer to participate was obtained from the control group. The pretest and posttest measurement tools were used. RAM-based CST was not applied. After the completion of the intervention group, individuals in the control group were reevaluated for inclusion and exclusion criteria. RAM-based CST of the control group were conducted with 14 patients (SMMSE scores of eight patients were 11, three patients were going to move out of the province, incontinence problem occurred for two patients, and three patients had anger-related problems) and successfully completed.

3.10 | Data collection

The data were collected in the period between May and June 2015. Pretest and posttest data of the patients in the experimental group were collected in the interview room of the association. Data of the patients in the control group were collected with home visits.

3.11 | Instruments

3.11.1 | Sociodemographic and disease background information form

A form consisting of nine questions was prepared by the researcher to determine the sociodemographic and disease characteristics of the participants.

3.11.2 | Coping and Adaptation Processing Scale

Coping and Adaptation Processing Scale (CAPS), which was developed by SC Roy and adapted into Turkish by Catal and Dicle,[35] helps define the coping and adaptation strategies of the people under the critical and challenging conditions. It consists of 47 items and five subdimensions. Cronbach's α coefficient was found to be .94 for the scale. For the scope validity of the scale, opinions were obtained from experts in the field. The difference between the scores given by experts of the scale items was statistically insignificant (Kendall's $W = 0.286$; $P = .642$). Items are scored with values ranging from 1 to 4. Number of the items, item numbers, and the lowest and highest values to be obtained from the scale and subscales are as follows: Participants can obtain scores ranging between 4 and 40 from 10 items in the subdimension of troubleshooting and focusing; 14 and 56 from 14 items in the subdimension of physical and conclusion; 9 and 36 from nine items in the subdimension of attention process; 6 and 24 from six items in the subdimension of systematizing process and 8 and 32 from eight items in the subdimension of establishing relationship. Scale's breakpoint or critical values were not defined.[35]

3.11.3 | Standardized Mini-Mental State Examination

This test, developed by Folstein et al,[36] can easily be applied. It provides details about the stage of the cognitive disorder. The Turkish validity and reliability study of the Standardized Mini-Mental State Examination (SMMSE) was conducted by Güngen et al.[37] It consists of orientation, recording, attention calculation, reminding, language tests, and structuring sections. Each question in the test is worth one point. The lowest and highest scores to be obtained from the scale are 0 and 30, respectively. Scores between 0 and 12 indicate a "severe cognitive disorder," between 13 and 22 indicate "mid-stage cognitive disorder" and 23 and 24 indicate "early-stage cognitive disorder." Scores between 25 and 30 suggest "no cognitive disorder." The correlation (r: .99) and (κ: 0.92) values between the total scores obtained from the scale were found to be high. At the end of the Kendall W test to determine the content validity, it was found that there was no statistically significant difference between the scores given by experts to the scale items (Kendall's $W = 0.220$, $P = .54$).[37]

3.11.4 | Alzheimer's Disease Patients' Quality of Life Scale

QOL-AD was developed by Logsdon et al.[38] This scale was adapted into Turkish by Akpınar and Küçükgüçlü[39]; it consists of 13 items. It provides details about patients' quality of life. Each item in QOL-AD is scored on a point scale ranging from 1 to 4 (1 = poor, 4 = great). Detailed instructions were given the interviewers or researchers who conducted the interview. Scoring is based on the simple aggregation of

the points obtained from all items. Scores obtained from the patients and caregivers can be separately calculated or assessed as a single score. For every marked item, 1 indicates poor, 2 indicates moderate, 3 indicates good, and 4 indicates great. Scores to be obtained from the scale range between 13 and 52. QOL-AD form's internal consistency reliability coefficient (Cronbach's α coefficient) for the patients and intra-group correlation coefficient were found to be .84 and .79, respectively. Content validity of QOL-AD was assessed through Kendall W analysis of assessment scores of experts to all items and it was determined that there was not a significant difference between scores given by the experts for each item (Kendall $W = 0.223$; $P = .095$) and there was compliance between experts. Higher scores from the scale indicate better QOL.[39]

3.12 | Ethical consideration

To conduct the study, ethical permission was obtained from Akdeniz University, Faculty of Medicine, Ethical Committee of Clinical Studies (No: 70904504/162, Decree No: 199). Institutional permission was obtained from the Akdeniz University Hospital and Social and Healthy Life Association. All participants (they are light and medium level) in the experimental and control group were informed about the name, objective, duration and type of the study, and the consent form was read aloud. Thus, it was ensured that they understood the objective and content of the research. Written consent was obtained from those who agreed to participate. Data collection and application phases were initiated after the consents were obtained.

3.13 | Data analysis

SPSS 18.0 package program was used to evaluate the study data. Numbers, percentages, mean values, and standard deviation—descriptive statistics methods—were used to evaluate the data. Intergroups, to compare the pretest and posttest scale scores of the randomized experimental and control groups, an independent t test was used for the scores with a normal distribution. However, the Mann-Whitney U test was used to compare the scores that did not comply with a normal distribution. Within groups, to compare the pretest and posttest data of the experimental and control groups, a paired-samples t test was used for the scores with a normal distribution. However, Wilcoxon's test was used to compare the data that did not comply with the normal distribution. Cronbach's α coefficient was used to calculate the general reliability and the reliability of the subdimensions.

4 | RESULTS

Comparisons between the sociodemographic and disease characteristics of the patients indicated that there was no statistically significant difference between the experimental and control groups ($P > .05$) (Table 2).

TABLE 2 Evaluating the introductory characteristics of the patients by homogeneity

	Experimental group (n = 30)		Control group (n = 30)		
	n	%	n	%	*P* value
Sociodemographic characteristics					
Sex					
Female	16	53.3	14	46.7	.39
Male	14	46.7	16	53.3	
Marital status					
Married	14	46.7	16	53.3	.84
Single, his wife is dead	16	53.3	14	46.7	
Education status					
Primary/secondary school	18	39.9	14	40.0	.30
High school	12	60.1	16	60.0	
Social assurance status					
Yes	21	69.9	22	73.3	.77
No	9	30.1	8	26.7	
Regular income status					
Yes	14	46.7	11	36.6	.43
No	16	53.3	19	63.4	
People who live together at home					
With his wife and children	6	20.0	10	33.3	.49
With his wife	14	46.7	11	36.6	
With the caregiver	10	33.3	9	30.1	
Disease characteristics					
Evolution of dementia					
First phase	12	39.9	8	26.7	.61
Middle phase	18	60.1	22	73.3	
	$\bar{X} \pm SD$		$\bar{X} \pm SD$		
Duration of having a dementia, m	15.53 ± 5.55		18.1 ± 6.16		.41

4.1 | Findings related to patients' cognitive functions

Cognitive functions of the patients in the experimental group were found to increase after the therapy (at the end of the 7th week) ($P < .05$). However, cognitive function levels of the patients in the control group were found to decline when compared to the beginning of the program, and the difference was found to be statistically significant ($P < .05$). This study demonstrated that the experimental group's cognitive function level was higher than that of the control group before the therapy. Although there was no statistically significant difference between the cognitive function levels of the experimental and control groups before the therapy, the cognitive function level of the experimental group was found to be higher than that of control group at the end of the measurements (performed in the 7th week); the difference was found to be statistically significant ($P < .05$) (Table 3).

TABLE 3 Comparing patients' mean Standardized Mini-Mental State Examination (SMMSE) scores with the pretest and posttest results

	Experimental group (n = 30)	Control group (n = 30)		
SMMSE	Median (25%-75%)	Median (25%-75%)	*U*	*P* value
Baseline	17.60 (14.50-20.00)	16.50 (13.50-19.00)	0.615	.80
Post-intervention	20.00 (17.50-23.60)	14.50 (11.00-17.00)	0.024	.00*
Test değeri	*t* = 2.418	*Z* = 0.418	…	…
P value	.001*	.04	…	…

Abbreviations: *t*, *t* test; *U*, Mann-Whitney *U*; *Z*, Wilcoxon analysis, *df* (degree of freedom): 2.
*$P < .05$.

4.2 | Findings related to patients' coping and adaptation levels

In the experimental group, dimensions of troubleshooting and focusing, making physical decisions, attention processing, systematizing, learning, and establishing relationships were found to be significantly better with the measurements performed after the application, and the difference was found to be statistically significant ($P < .05$). Regarding the control group, no difference was found before and after the application ($P > .05$). In the experimental group, dimensions of troubleshooting and focusing, making physical decisions, attention processing, systematizing, learning, and establishing relationships were found to be better than those of the control group after the application, and the difference was found to be statistically significant ($P < .05$) (Table 4).

TABLE 4 Comparing patients' total Coping and Adaptation Processing Scale (CAPS) scores and mean subdimension scores with the pretest and posttest results

	Experimental group (n = 30)	Control group (n = 30)		
CAPS subdimensions	Median (25%-75%)	Median (25%-75%)	*U*	*P* value
Troubleshooting and focusing				
Baseline	15.30 (13.20-17.50)	15.00 (13.00-17.00)	0.754	.12
Post intervention	26.00 (28.00-24.50)	15.00 (13.50-17.00)	23.52	.00
Test value*	*t* = 0.924	*Z* = 2.469	…	…
P value	.003	.38	…	…
Making physical decisions				
Baseline	23.00 (19.00-28.00)	24.00 (20.50-28.00)	0.179	.34
Post intervention	30.00 (27.00-33.50)	23.00 (15.50-31.50)	29.753	.00
Test value*	*t* = 0.007	*Z* = 2.634	…	…
P value	.01	.47	…	…
Attention processing				
Baseline	15.00 (12.50-18.50)	15.50 (10.50-20.50)	0.237	.09
Post intervention	25.00 (22.50-28.50)	14.00 (12.50-16.00)	5.86	.022
Test value*	*t* = 6.744	*Z* = 3.178	…	…
P value	.00	.43	…	…
Systematizing				
Baseline	11.00 (7.50-14.50)	11.30 (8.50-14.50)	0.280	.59
Post intervention	17.00 (16.50-18.50)	11.00 (8.50-14.00)	24.95	.00
Test value*	*t* = 0.751	*Z* = 7.654	…	…
P value	.00	.67	…	…
Learning and establishing relationships				
Baseline	15.50 (13.50-17.00)	16.00 (11.00-21.50)	0.058	.81
Post intervention	20.00 (16.50-23.00)	15.00 (10.00-20.00)	7.03	.01
Test value*	*t* = 3.421	*Z* = 5.942	…	…
P value	.03	.10	…	…
Scale total score				
Baseline	81.50 (74.50-88.00)	83.00 (75.50-90.00)	0.129	0.72
Post intervention	101.00 (85.50-116.00)	82.50 (64.50-103.00)	32.86	0.00
Test value*	*t* = 0.741	*Z* = 3.647	…	…
P value	.003	.13	…	…

Abbreviations: *t*, *t* test; *U*, Mann-Whitney *U*; *Z*, Wilcoxon analysis, *df* (degree of freedom): 2.
*$P < .05$.

TABLE 5 Comparing mean Quality of Life of Alzheimer's Disease Patients Scale (QOL-AD) scores with the pretest and posttest results

	Experimental group (n = 30)	Control group (n = 30)		
QOL-AD	Median (25%-75%)	Median (25%-75%)	*U*	*P* value
Baseline	25.00 (22.50-28.00)	26.50 (22.50-30.00)	1.691	.19
Post intervention	37.00 (31.50-42.60)	24.50 (21.00-27.00)	10.827	.00*
Test değeri	*Z* = 0.742	*t* = 3.740	…	…
P value	.00*	.10	…	…

Abbreviations: *t*, *t* test; *U*, Mann-Whitney *U*; *Z*, Wilcoxon analysis, *df* (degree of freedom): 2.
*$P < .05$.

4.3 | Findings related to patients' QOL

The experimental group patients' quality of life was found to increase after the therapy (at the end of the 7th week) ($P < .05$). However, QOL of the patients in the control group was found to decline when compared to that of the experimental group, and the difference was found to be statistically insignificant ($P > .05$). No statistically significant difference was found between the QOL of the experimental and control group ($P > .05$) before the application. However, after the application, QOL of the experimental group was found to be better than that of the control group following the measurements; the difference was found to be statistically significant ($P < .05$) (Table 5).

5 | DISCUSSION

One of the main focuses of the research is to cope with the disease process and increase the adaptation of individuals. With the application of CST based on RAM, it is aimed to strengthen the adaptive behavior of individuals related to the four adaptive domains defined in RAM.

5.1 | Cognitive functions

As AD progresses, deteriorations may be seen in cognitive functions and social skills such as intelligence, learning, memorizing, talking, problem-solving, orientation, perception, focusing, and judging. Disorders in these functions and skills make it difficult for the people to live independently.[40,41]

A patient begins to be unfamiliar with his/her environment, and his/her adaptation deteriorates. The functions in which the regression is seen most are the cognitive functions.[42] Cognitive changes seen during the disease process are peculiar to individual patients, and the memory may be largely affected.[43] Patients' cognitive functions can be enhanced and sustained with CST.[44] The present study suggests that RAM-based CST improves experimental group's cognitive functions and thus enhances the cognitive and affective coping skills of the patients. Roy emphasizes that Alzheimer's disease patients' cognitive and affective coping skills should be improved to ensure that they adapt to the disease.[8] Although there are no studies examining the effect of RAM-based CST on AD patients' cognitive functions, there are many studies that evaluate the effect of CST on dementia patients' cognitive functions.[30] The reason why the effect of RAM-based CST on dementia patients' cognitive functions cannot be evaluated may be attributable to CST not having been used in nursing practice to date.

The studies of Orrell et al[2] indicate that CST applied to AD patients improves their cognitive functions. CST was applied to dementia patients in the studies of Orrell et al[45] and Capotosto et al[1] patients' cognitive functions were found to be better. We suggest that RAM-based CST improves a patient's cognitive functions much more effectively, although the enhancement in patients' cognitive functions is comparable to the findings of our study. However, the hypothesis (H1) "Cognitive functions of patients who received RAM-based CST are better than those of the control group" was also verified.

5.2 | Coping and adaptation

Roy attributes a person's adapting skills to having sufficient energy and ability to positively adapt to the stimulants.[7] Roy states that the objective of nursing is to ensure and improve the adaptation that is necessary for the welfare and well-being of the patient.[8] Regressions in visual and spatial behaviors that resulted from advanced AD and deterioration in judging and orientation were healed, and the current condition was maintained. Effectiveness of these activities was evaluated using the CAPS results. Therefore, it is suggested that when patients' cognitive and affective coping mechanisms are enhanced, the regulatory coping mechanism is affected.[7]

CAPS, developed by Roy, is a measurement tool based on RAM. It is influenced by factors related to cognitive processes. RAM attributes dementia to a focus stimulant that affects patients' adaptation levels.[8] To affect the focus stimulant and enhance the adaptation, the basic term in RAM, patients may be helped to develop effective behavior in the physiological, self-perception, role function, and mutual attachment domains.[7,8] Determining the adaptation levels of AD patients before the RAM-based CST application is important for evaluating the adaptation following the application. CST helps patients improve their cognitive and affective

coping behaviors and thus enhances their adaptations to their disease.[46] Patients' coping and adaptation levels were evaluated using CAPS in our study. However, no study determining the coping and adaptation levels of dementia patients who received RAM-based CST with CAPS was found in the results of the literature review. Therefore, outcomes of the study that evaluated the coping levels of patients with different measurement tools following CST application, and the outcomes of the study that evaluated the effect of CST on different patient groups' coping and adaptation levels, were discussed. Dementia patients' ability to cope with the disease was examined before and after the application of CST, and the coping skills of patients who received CST were found to be better than those of patients who did not receive CST.[47] Navarro et al[48] applied CST to Alzheimer's patients and found that patients' ability to cope with the disease was enhanced.[23] report in their study, in which they examined the effect of CST on certain parameters of dementia patients using pretest and posttest design, that CST improves patients' ability to cope with the disease.

These findings indicate that CST enhances patients' ability to cope with the disease. Our study, like other studies conducted to examine this topic, indicated that RAM-based CST positively affected patients' ability to cope and adapt and enhanced their adaptation to the disease. However, the hypothesis (H2) "Coping and adaptation skills of patients who received RAM-based CST are better than those of the control group" was also verified.

5.3 | Quality of life

Roy suggests that patients' physical, emotional, social, cultural, spiritual, and intellectual needs should be met to ensure that they adapt to any conditions they face.[8] Their interest in themselves declines gradually: They do not want to take baths or change their clothes; they begin to move away from themselves.[49] With RAM-based CST, their QOL can be enhanced, and their adaptation to the disease can be ensured. The effectiveness of the activities in RAM-based CST was evaluated with the results of QOL-AD. Therefore, it is suggested that patients' cognitive and affective coping mechanisms are enhanced, and their regulatory coping mechanism is affected.

Because the temporal lobe is affected by AD, a patient begins to forget his/her recent memory. Old patients forget new people and places they see, and their orientation begins to deteriorate. As the disease progresses, semantic memory (related to meanings) begins to deteriorate, and it becomes hard to remember historical facts and names. Patients may confuse their relationship with their living relatives and their identities.[44,48] Roy states that mutual attachment covers a patient's family, relative, friend, and support systems and their relationships.[8] Roy also focuses on the interactions related to seeing and showing value, love, and respect. Mutual attachment within a group indicates group activities that include private and general contacts and are performed with the people in and out of the group.[50] Effectiveness of these activities was evaluated using the QOL-AD results. Therefore, it is suggested that patients' cognitive and affective coping mechanisms are enhanced and regulatory coping mechanism is affected.

When patients' characteristics were compared to the period before the application of RAM-based CST, the QOL of the patients in the experimental group was found to be significantly better ($P < .05$), and the QOL of the control group was found to be significantly worse ($P > .05$). No statistically significant difference was found between the QOL of the experimental and control groups before the application ($P > .05$). With the measurements performed following the application, the experimental group's QOL was found to be significantly better than that of the control group ($P < .05$). Studies examining the relationship between the CST applied to AD patients and QOL yield outcomes similar to those of our study. CST's effect on patients' QOL was examined in the experimental study conducted by Knapp et al,[51] and the experimental group's QOL was found to be significantly better. In the study conducted by Spector et al,[52] QOL of the group that received CST was found to be better than that of the control group. The study conducted by Chiu et al[47] indicated that CST enhances the QOL of dementia patients. The study conducted by Capotosto et al,[1] which examines the effect of CST on dementia patients' cognitive functions and QOL, indicated that the cognitive functions of the group that received CST were better than those of the group which did not receive CST. We suggest that RAM-based CST improves a patient's QOL more effectively although the enhancement in patients is comparable to the findings of our study. This finding also verifies the hypothesis (H3) "Quality of life of patients who received RAM-based CST is better than that of the control group."

6 | CONCLUSIONS

RAM-based CST enhanced the cognitive functions of the patients in the experimental group. Cognitive functions of the control group patients who did not receive RAM-based CST regressed. Following the application of RAM-based CST, the coping and adaptation functions of the patients in the experimental group were found to be better than those of the patients in the control group in all subdimensions. Similarly, following the application of RAM-based CST, QOL of the patients in the experimental group was found to be better than the cognitive functions of the control group.

6.1 | Implications for nursing practice

Age-related diseases are rapidly increasing as the world population becomes older. Alzheimer's disease is a neurological, advanced age disease that has serious negative effects on patients, patient relatives, and national economies. Therefore, it is significant. In this study, CST, which is commonly used for AD patients, was applied based on a nursing theory and increased patients' coping skills-compliance, cognitive functions and QOL, which helped to ensure their independence.

The CST based on RAM strengthened the cognition of Alzheimer's disease patients. This reduced disease and care expenses and made an indirect contribution to the national economy. The CST based on RAM is a new nursing practice that can be used by practitioner nurses to improve the cognition of Alzheimer's disease patients and ensure their compliance with the disease treatment. In addition, the CST was applied based on a nursing theory and introduced to nursing as a therapy model that can be applied based on a theory.

7 | LIMITATIONS

This study has a sample limitation because it was conducted with patients applying to a health institution. The outcomes of the study cannot be generalized because external validity could not be ensured, but these outcomes may ultimately contribute to the generalization. Also, blending was not performed because the pretest and posttest data were collected and RAM-based CST was applied by the same person; this was also considered a limitation of the study. The preferred statistical tests in the study are among the limitations of the study.

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CONFLICT OF INTERESTS

The authors declare that there are no conflict of interests.

AUTHOR CONTRIBUTIONS

All authors have agreed on the final version and meet at least one of the following criteria (recommended by the ICMJE; http://www.icmje.org/recommendations/): substantial contributions to conception and design, acquisition of data or analysis and interpretation of data; drafting the article or revising it critically for important intellectual content.

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