

Impact of a Multimodal Rehabilitative Intervention on Demented Patients and Their Caregivers

Maria Luisa Onor, MD, PhD, Marianna Trevisiol, PsyD, Cecilia Negro, PsyD, Signorini Alessandra, PsyD, Marisa Saina, MD, PhD, and Eugenio Aguglia, MD

Alzheimer's disease is becoming a social, political, and economic issue as a result of both the growing number of people affected and the enormous economic, social, and emotional costs involved in caring for Alzheimer's patients. The aim of this study is to evaluate the effects of a multimodal intervention program for patients with Alzheimer's disease and their caregivers. The study was conducted on a sample of 32 subjects: 16 Alzheimer's patients and their caregivers. The results obtained after the multimodal rehabilitation program showed

that the Alzheimer's patients had a more stable cognitive status and improved mood. Regarding the psychoeducational program, the results demonstrate the efficacy of such interventions in terms of increasing and preserving the caregivers' coping skills and enhancing their perception of the value of support groups.

Keywords: cognitive rehabilitation; dementia; psychoeducational intervention; caregivers

Alzheimer's disease (AD) is a neurodegenerative disease characterized by the progressive deterioration of higher cognitive functions not only limited to loss of memory and other neuropsychological functions. AD is characterized by the presence of noncognitive disturbances, such as the inability to carry out basic everyday tasks (washing, dressing, eating), the inability to perform instrumental activities (using the telephone, handling money), and behavioral disorders (agitation, aggression, and wandering). All of these factors affect both the patient's life and the caregiver's life, as AD has a considerable impact on the family, and the burden of care increases the caregiver's level of stress.¹ During the course of the disease, the caregiver experiences several emotions,

such as stress, frustration, and anger toward the family member with AD.

Patients and caregivers can be helped to cope better with the disease by appropriate interventions that target both the patient and caregiver. Patient-centered techniques include pharmacological treatment and rehabilitation through reality orientation therapy, reminiscence therapy, validation therapy, and occupational therapy, that stimulate the demented patient's residual cognitive skills and improve or maintain residual functional abilities. Caregiver-centered interventions may be divided into 4 categories: group-based interventions,² individual-based interventions,³ technology-based interventions,⁴ and interventions on the environment.⁵

For many years, pharmacological therapy was thought to be the only possible or effective intervention in people with AD. In fact, recent scientific advances, stimulated above all by genetics research, have provided insight into the pathogenetic mechanisms underlying the disease, although they have not had an immediate effect on treatment. The drugs used to treat AD, cholinesterase inhibitors and memantine, slow down the progressive and relentless decline in cognitive function, thus responding only in part to the

From the Department of Clinical, Morphological, and Technological Sciences, U.C.O. of Clinical Psychiatry, University of Trieste, Trieste, Italy.

The authors have reported no conflicts of interest.

Address correspondence to: Maria Luisa Onor, MD, PhD, Department of Clinical, Morphological and Technological Sciences, U.C.O. of Clinical Psychiatry, University of Trieste, Via de Ralli n. 5, Trieste, Italy; e-mail: marialuisa.onor@libero.it.

complexity of the disease. In addition to pharmacological therapy, which still falls short of correcting the important pathological changes that characterize dementia, other forms of therapy are gaining ground, cognitive rehabilitation in particular.⁶⁻¹⁰

When applied to dementia patients, the term *rehabilitation*¹¹ refers to a process that, rather than attempting to restore the levels of cognitive function that have been irretrievably lost, aims to maintain the highest possible level of independence consistent with the patients' clinical condition, through stimulation of residual cognitive skills, intervention on behavioral aspects, maintenance of functional abilities, and improvement of socialization and interaction with the environment.

Several therapies have been used for rehabilitation purposes: reality orientation therapy,¹² reminiscence Therapy,¹³ occupational therapy,¹⁴ validation therapy,¹⁵ and gentle care.¹⁶ All these therapies generally aim to stimulate the demented patient's residual cognitive skills, improve or maintain residual functional abilities, act on behavioral aspects, retrain the patients in communication and socialization skills, retrain them to cooperate in social tasks, and restore their interest in their surroundings by increasing their level of control and self-confidence.

Reality orientation therapy (ROT) is the most commonly used treatment in patients with spatial and temporal orientation disorders and cognitive deficiencies. First described by Folsom¹² as a technique whose main outcomes regard improvement of the cognitive and behavioral performance of Alzheimer's patients, ROT consists in presenting orientation information (time, place, and person-related) to provide patients with a greater understanding of their surroundings. It aims to preserve the patients' orientation in space and time, thereby reducing their needs and improving their use of external means.

Zanetti et al¹⁷ have shown that AD patients undergoing repeated cycles of ROT (on average, 15 weeks) had a lower level of cognitive decline after 1 year compared with patients undergoing a single 4-week cycle. Likewise, Ermini-Funfschilling and Meier¹⁸ engaged 19 patients with mild AD in weekly ROT sessions over 1 year in which they focused on exercises to stimulate temporal and spatial orientation, with the result that the patients' overall mental functions, as measured by the Mini-Mental State Examination (MMSE),¹⁹ remained stable, whereas they were found to be significantly reduced in the control group. A review of the literature²⁰ suggested

that ROT might be considered both as part of a more general program⁸ or used alone to improve orientation and memory. Indeed ROT has been demonstrated to have clear benefits on Alzheimer's patients in terms of both cognitive and behavioral factors.^{21,22}

Reminiscence therapy (RT) has been defined as the recall of events in a person's life. It is usually carried out as group therapy consisting of weekly sessions in which participants are encouraged to discuss past events, often with the aid of photographs, music, objects and videos. Butler²³ first described RT as a natural process in which past experiences and unresolved conflicts resurface. Because long-term memory is usually the last type of memory to deteriorate, it was noted that reminiscence could be a valuable tool for communicating with individuals with memory deficits. Reminiscence was thus developed as a therapeutic technique, defined by Woods et al⁵ p. 142 as a "vocal or silent recall of events in a person's life, either alone or with another person or group of people". Ebersole²⁴ identified some of the therapeutic factors of RT such as socialization, stimulation of memory, and self-actualization. Since 1979, several studies have investigated the effectiveness of RT in persons with dementia.²⁵⁻²⁷ A recent review²² has highlighted that, although the benefits of RT are difficult to evaluate when RT is used alone, the benefits are clearer when RT is included in a broader program, for example in combination with ROT.²⁷ Baines et al²⁷ reported that the benefits seen in patients participating in a cycle of ROT followed by RT were greater and more significant, in terms of both quality of life and cognitive performance, than those seen in patients undergoing RT alone or receiving no form of therapy.

Occupational therapy targets the slow but relentless loss of ability to carry out the activities of daily living, which not only limits the patient's independence but is a cause of conflict between the patient and the caregiver. Occupational therapy aims to activate and enhance the patient's basic residual skills (housework and personal care) which help preserve individual competence, improving functional skills and consequently the ability to interact socially. The "reactivation" induced by occupational therapy may increase mental mobility by restoring the subject's decision-making and control capabilities in performing daily activities. All this boosts self-esteem, fulfills the need for active engagement, and promotes the development of new interests and the assumption of a gratifying role in one's social environment, thereby contrasting the

progression and the negative manifestations of dementia. Reduced anxiety and frustration positively influence affective tone and facilitate socialization and integration, making it easier to manage the patients' disruptive behavior.¹⁴

In addition to interventions focusing on the patient, several interventions that aim to improve the caregiver's coping skills also exist: group interventions,² individual interventions,³ technological interventions,⁴ and interventions on the environment.

Group support programs represent an interesting and inexpensive solution for reducing caregiver burden and stress. To be effective, these programs must have a long duration, make reference to a specific theoretical framework, and have well-defined objectives focusing primarily on the management of problem behaviors and their effects. Kahan et al²⁸ reported a reduction in burden and depression with this form of intervention, and Morris et al²⁹ reported a reduction in psychological comorbidity in spouses and adult children.

The most compelling evidence supporting an intervention targeted toward the caregiver has been provided by Mittelman et al³ who reported that individual and family counseling was effective in reducing depression. Later, Teri et al³⁰ reported achieving lower levels of depression in both the caregivers and dementia patients by using 2 behavioral techniques: 1 emphasizing patient pleasant events and 1 emphasizing caregiver problem solving.

Finally, technological interventions have been investigated in 2 studies conducted in the United States. These interventions were based on a computer network providing education, decision support and communication⁴ and a telephone support network³¹ to caregivers of persons with AD. Both studies^{4,31} found a significant improvement in decision-making confidence⁴ and an increase in the subjective ratings of social support and knowledge.³¹

All the interventions described above are aimed to reduce caregiver stress³²⁻³⁵ and depression, improve the caregiver's psychological well-being, and delay institutionalization.^{32,36,37} The results obtained so far and summarized in a recent review³⁸ have shown moderate effects on the outcome measures considered in the studies. The variability of outcomes can be ascribed to different factors, such as heterogeneity of the sample in terms of age, sex, whether the caregiver was living with the patient, degree and severity of dementia, and the presence of behavioral and psychological symptoms of dementia.³⁹⁻⁴¹

Unfortunately, most studies have been conducted with small samples and using heterogeneous methods and groups. However, despite the limited results, the caregivers report satisfaction with the interventions proposed.^{28,29,41-45} In fact, the caregivers have been effective in improving their coping skills⁴⁶ and relationship with the patient³³; in some cases the intervention led to delayed institutionalization.³³

The interventions that proved to be most effective were those that spanned a longer duration and involved longer term contact between caregivers and patients. The only crucial aspect in this sense is the need to involve the caregiver in the program with the patient, so as to teach the caregiver strategies to involve the patient.³⁰ Teri et al³⁰ investigated the efficacy of 2 nonpharmacological treatments of depression in patients with AD. The 2 active behavioral treatments, 1 emphasizing patient pleasant events and 1 emphasizing caregiver problem solving, were compared with an equal-duration typical care condition and a wait list control. Seventy-two patient-caregiver dyads were randomly assigned to 1 of 4 conditions and assessed pre-, post-, and at 6-month follow-up. Patients in both behavioral treatment conditions showed significant improvement in depression symptoms and diagnosis as compared with the 2 other conditions. These gains were maintained at 6-month follow-up. Caregivers in each behavioral condition also showed significant improvement in their own depressive symptoms, whereas caregivers in the 2 other conditions did not. Results indicate that behavioral interventions for depression are important and effective strategies for treating demented patients and their caregivers.

In our view, because dementia impacts both patients and caregivers, it requires a multimodal approach with interventions targeting both the patient and caregiver. The aim of our study is to evaluate the effects of an integrated rehabilitation program consisting of ROT, RT, and occupational therapy on a group of patients with AD and a simultaneous psychoeducational intervention for their caregivers. Use of the 3 techniques in combination was aimed at targeting cognitive function through ROT, behavioral aspects through ROT and RT, and functional skills through occupational therapy. The simultaneous psychoeducational intervention on the caregivers aimed to assess the possibility of reducing stress, anxiety, and depression through dissemination of dementia-specific information relevant to stimulation strategies and effective management of behavioral disturbances

and to evaluate the value of psychological support for caregivers.

Methods

The study participants were 32 subjects, 16 patients, and 16 caregivers selected from a group of 200 eligible subjects who had been asked to participate in the multimodal intervention program. The sample was recruited at the U.C.O. of Clinical Psychiatry of the University of Trieste, Italy. The 16 patients were aged 60–80 years and had a diagnosis of mild-to-moderate Alzheimer's dementia according to the criteria of the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV)* and the National Institute of Neurological and Communicative Diseases and Stroke/Alzheimer's Disease and Related Disorders Association. We excluded subjects with severe hearing or visual impairments or organic diseases that reduced their functional abilities. We also excluded subjects with psychotic disorders. Simple randomization was used. Eight patients were randomly assigned to the rehabilitation group and 8 to the control group.

The patients and their caregivers participated in the multimodal intervention program. The patients attended the rehabilitation program, which consisted of three 60-minute sessions a week of ROT, occupational therapy, and RT over a period of 4 months, delivered by a psychologist not blinded to the aims of the study. The psychologist received specific training in the 3 therapies. The caregivers assigned to the psychoeducational group (n=8) attended 60-minute weekly sessions where they received information about dementia and the course of the disease and were taught to repeat some of the activities used in ROT and occupational therapy at home at various times of the day.

The remaining 8 patients and 8 caregivers in the control group received no form of intervention. All patients had been receiving acetylcholinesterase inhibitors for more than 6 months.

Instruments

All 8 AD patients were administered 4 tests. MMSE¹⁹ was administered at baseline (T0) and after 2 (T1) and 4 months (T2) of rehabilitation to assess cognitive function. The total score ranges from 0 (*maximum cognitive deficit*) to 30 (*no cognitive deficit*),

where a score of 0–9 indicates severe dementia, 9–20 moderate dementia, 21–26 mild dementia, and 27–30 normal cognitive function.

Milan Overall Dementia Assessment (MODA)⁴⁷ was administered at baseline (T0) and after 4 months of rehabilitation (T2) to assess cognitive function. This battery of tests includes 4 subtests measuring orientation (temporal, spatial, personal, and familiar), a section on autonomy, and a test on the following cognitive domains: memory (history), attention (reversal learning, attentional matrix), abstraction (verbal intelligence), language (categorical word production), visual perception (Street completion test), visual construction and executive functions (reversal learning, token test), and agnosia (digital agnosia). The score ranges from 0 to 100, where a score of >60 indicates mild cognitive impairment, 40–60 moderate impairment, and <40 severe impairment.

Instrumental Activities of Daily Living (IADL)⁴⁸ and Activities of Daily Living (ADL)⁴⁹ were administered at baseline (T0) and after 2 (T1) and 4 months (T2) of rehabilitation to assess independence in daily life. The total IADL score ranges from 0 (*dependent*) to 8 (*independent*), whereas the total ADL score ranges from 0 (*dependent*) to 6 (*independent*).

The Geriatric Depression Scale (GDS),⁵⁰ a test that screens for depression in elderly subjects and those with mild-to-moderate dementia, was administered at baseline (T0) and after 2 (T1) and 4 months (T2) of rehabilitation. The maximum score is 30, where a score of 0–15 indicates a normal subject and >15 a depressed subject.

Cognitive Stimulation Program

The cognitive stimulation program is composed of three 60-minute group sessions a week over a period of 4 months. The intervention consists of 2 phases. Phase 1 covers 24 sessions of formal ROT. This phase lasts 8 weeks. Phase 2 covers 12 sessions of activities stimulating both implicit memory (washing one's face, brushing one's teeth, shaving, removing make-up, making coffee, setting the table, opening/closing, locking/unlocking doors, writing and reading postcards and letters, using the phone, looking up phone numbers) through occupational therapy (12 sessions), and the memory of events through RT (photographs and postcards of important events and people of the 1940s–1990s, familiar items from the past, old songs, and rhymes). This phase lasts 8 weeks.

Caregivers Program

The caregiver group consisted of 16 subjects caring for a relative with mild-to-moderate Alzheimer's dementia according to the *DSM-IV* criteria. Eight were randomly assigned to the psychoeducational program and 8 to the control group.

All 8 caregivers completed a sociodemographic form and were administered the following tests at base-line (T0) and after 2 (T1) and 4 months (T2) of the psychoeducational program: Brief Symptom Inventory (including Anxiety and Depression subscales); The Caregiver Burden Inventory⁵¹ (CBI), a tool designed to analyze the multi-dimensional aspect of the burden of care of people caring for patients with AD and related dementias. It consists of 24 items that can be divided into 5 sections: objective burden, developmental burden, physical burden, social burden, and emotional burden. The score ranges from 0 (*no burden of care*) to 96 (*heavy burden of care*).

The caregivers in the psychoeducational group attended weekly 60-minute sessions where they received information about dementia and the course of the disease and were trained to repeat some of the activities used in ROT and occupational therapy at home at various times of the day. The course consisted of once-weekly meetings over a period of 4 months. The 16 meetings were divided into 2 modules.

The first module, called Medical, dealt with the clinical, diagnostic, and treatment aspects of the disease. The clinical component addressed epidemiology, risk factors, disease stages, the progression of cognitive and behavioral symptoms, and the reduction of independence in daily living. The diagnostic component dealt with differential diagnosis. The treatment component looked at currently available pharmacological options and ways to deal with symptoms.

The second module, called Psychological, first addressed the patients' experience of the disease and their problems coping, and then the emotions, stress, and feelings experienced by the caregivers. Each module consisted of 8 sessions, lasting 1 hour each.

The group was led by a psychiatrist and an educator. In the first module, the 1-hour sessions were divided into 30 minutes of formal presentation on a specific topic, followed by 30 minutes of discussion. In the second module, the participants were asked to discuss given topics relating to patient care problems and caregivers' experiences.

Results

Patient Results

A total of 16 patients took part in the study, 8 of whom were randomly assigned to the rehabilitation group and 8 to the control group. The patients in the rehabilitation group were 5 men (62.5%) and 3 women (37.5%) with a mean age of 68 years ($SD \pm 6.5$) and a level of schooling of 8 years ($SD \pm 3.6$). The patients in the control group were 4 men (50%) and 4 women (50%), with a mean age of 72 years ($SD \pm 5.2$) and a level of schooling of 8 years ($SD \pm 2.7$).

None of the patients participating in the cognitive stimulation program dropped out of the course during the 4 months of treatment. The data were analyzed using analysis of variance for comparisons between groups and post hoc test for intragroup comparisons.

Cognitive Measures

MMSE Results

Intragroup comparison. In the rehabilitation group, there were no differences in the MMSE scores between T0 and T1 ($t = -0.418$; $P = .688$) and between T2 and T0 ($t = -1.234$; $P = .257$), but a statistically significant difference was found between T1 and T2 ($t = -2.393$; $P = .048$). In the control group there were no differences in the MMSE scores between T0 and T1 ($t = -1.139$; $P = .292$), between T1 and T2 ($t = 0$; $P = 1$), or between T2 and T0 ($t = -1.616$; $P = .15$) MMSE scores.

Comparison between groups. Between the control and rehabilitation groups, there were no differences in the MMSE scores or in the Δ MMSE scores between T0 and T1, between T1 and T2, and between T2 and T0 (Table 1).

MODA Results

Regarding the results obtained on MODA, we considered it useful to compare the difference between T0 and T2 in the 2 groups, as shown in Table 2.

Comparison between groups and Δ . The patients' cognitive performance remained stationary in the 2 groups. There were no differences in the MODA results between the 2 groups at Δ T0–T2.

Table 1. Mini-Mental State Examination Results of the Rehabilitation Group and the Control Group at T0, T1, and T2 and the T0–T1, T1–T2, and T2–T0 Differences

	Rehabilitation Group	Control Group	<i>t</i> Value	Significance
T0	23.12 ± 4.15 ^a	20.00 ± 2.20	3.531	.081
T1	23.62 ± 4.92	21.25 ± 3.01	1.354	.264
T2	24.37 ± 4.30	21.25 ± 2.76	2.982	.106
T0–T1	0.50 ± 3.38	1.25 ± 3.10	0.214	.651
T1–T2	0.75 ± 0.88	0 ± 1.41	1.615	.224
T2–T0	1.25 ± 2.86	1.25 ± 2.18	0	1

T0 = baseline; T1 = after 2 months of rehabilitation; T2 = after 4 months of rehabilitation.

a. Statistics are mean ± standard deviation.

Autonomy Measures

ADL Results

Intragroup comparison. Autonomy levels, as measured by the ADL scales, remained stable throughout the rehabilitation period. There were no differences

between T0 and T1 ($t = 0$; $P = 1$), between T1 and T2 ($t = 0$; $P = 1$), or between T2 and T0 ($t = 0$; $P = 1$) in the rehabilitation group. There were no differences between T0 and T1 ($t = 1.528$; $P = .170$), between T1 and T2 ($t = 0.798$; $P = .451$), or between T2 and T0 ($t = 1.3$; $P = .168$) in the control group.

Comparison between groups. There were no differences between the 2 groups at T0 ($t = 1.4$; $P = .256$), T1 ($t = 3.31$; $P = .09$), and T2 ($t = 3.5$; $P = .082$) and at Δ ADL at T0 ($t = 0.476$; $P = .506$), T1 ($t = 0.636$; $P = .438$), and T2 ($t = 1.167$; $P = .298$; Table 3).

IADL Results

Intragroup comparison. There were no differences between T0 and T1 ($t = 0.284$; $P = .785$), between T1 and T2 ($t = -1$; $P = .351$), or between T2 and T0 ($t = 0$; $P = 1$) in the rehabilitation group. There were no differences between T0 and T1 ($t = 1$; $P = .351$), between T1 and T2 ($t = 1.871$; $P = .104$), or between T2 and T0 ($t = 1.433$; $P = .195$) in the control group.

Table 2. Results Obtained in the Milan Overall Dementia Assessment (MODA) Comparison Between the T0–T2 Difference in the Rehabilitation Group Versus the T0–T2 Difference in the Control Group

Subtest	Rehabilitation Δ T0–T2 Mean ± SD	Control Δ T0–T2 Mean ± SD	<i>t</i> Value	Significance
Temporal orientation	–0.18 ± 1.14	0.71 ± 2.68	0.75	.39
Spatial orientation	–0.12 ± 2.26	0.37 ± 0.51	5.09	.41
Personal orientation	–0.5 ± 2.26	–1.81 ± 3.04	1.05	.32
Familiar orientation	0 ± 2	–0.75 ± 1.28	0.79	.38
Total orientation	–0.81 ± 5.37	1.21 ± 4.51	0.66	.42
Autonomy	–2.12 ± 0.88	–0.5 ± 1.19	4.24	.59
Reversal learning	0 ± 0.75	–0.75 ± 1.9	1.06	3.19
Attentional matrix	0.25 ± 1.48	–1.12 ± 3.22	3.57	.08
Verbal intelligence	0.16 ± 0.75	0 ± 1.3	0.44	.83
Story	0.28 ± 2.21	–0.88 ± 1.37	1.57	.23
Word generation	0.5 ± 0.92	0.37 ± 0.91	0.074	.79
Token test	–0.12 ± 1.09	–0.37 ± 0.44	0.35	.56
Digital agnosia	0.37 ± 0.74	0 ± 2.5	0.16	.69
Construction apraxia	–0.06 ± 0.41	–2.5 ± 0.46	0.72	.40
Street	–0.12 ± 0.64	1.2 ± 0.83	0.45	.51
Total neuropsychology	2.8 ± 7.81	–2.76 ± 7.44	2.12	.16
Total MODA	–0.28 ± 14.17	–2.08 ± 10.72	0.08	.78
Total correct score	–0.7 ± 14.07	1.93 ± 10.76	0.03	.84

T0 = baseline; T2 = after 4 months of rehabilitation.

Table 3. Results of the Comparison of the Activities of Daily Living Between the 2 Groups at T0, T1, and T2 and the T0–T1, T1–T2, and T2–T0 Differences

	Rehabilitation Group	Control Group	<i>t</i> Value	Significance
T0	5.50 ± 0.76 ^a	5.00 ± 0.92	1.4	.256
T1	5.50 ± 0.76	4.75 ± 0.88	3.316	.090
T2	5.50 ± 0.76	4.50 ± 1.30	3.5	.082
T0–T1	0 ± 0.92	–2.5 ± 0.46	0.476	.506
T1–T2	0 ± 0	–2.5 ± 0.89	0.636	.438
T2–T0	0 ± 0.92	–2.5 ± 0.92	1.167	.298

T0 = baseline; T1 = after 2 months of rehabilitation; T2 = after 4 months of rehabilitation.

a. Statistics are mean ± standard deviation.

Table 4. Results of the Comparison of the Instrumental Activities of Daily Living Independence Scales Between the 2 Groups at T0, T1, and T2 and the T0–T1, T1–T2, and T2–T0 Differences

	Rehabilitation Group	Control Group	<i>t</i> Value	Significance
T0	3.50 ± 1.92 ^a	2.75 ± 3.10	0.337	.571
T1	3.37 ± 1.76	2.37 ± 2.55	0.821	.379
T2	3.50 ± 1.85	1.87 ± 2.23	2.512	.135
T0–T1	–0.125 ± 1.24	–0.37 ± 1.06	0.187	.672
T1–T2	0.125 ± 0.35	–0.5 ± 0.75	4.487	.053
T2–T0	0 ± 1.5	–0.87 ± 1.72	1.163	.299

T0 = baseline; T1 = after 2 months of rehabilitation; T2 = after 4 months of rehabilitation.

a. Statistics are mean ± standard deviation.

Comparison between groups. There were no differences between the 2 groups at T0 ($t = 0.337$; $P = .571$), T1 ($t = 0.821$; $P = .379$), and T2 ($t = 2.512$; $P = .135$) and in Δ IADL scores at T0–T1 ($t = 0.187$; $P = .672$), T1 ($t = 4.487$; $P = .053$), and T2–T0 ($t = 1.163$; $P = .299$; Table 4).

Depression Measure

GDS Results

Intragroup comparison. In the rehabilitation group, there were statistically significant differences between T0 and T1 ($t = 2.683$; $P = .031$) and between T0 and T2 ($t = 4.352$; $P = .003$) but not between T1 and T2 ($t = 1.342$; $P = .222$). In the control group, there were statistically significant differences between T1 and T2 ($t = –2.447$; $P = .044$) and between T0 and T2 ($t =$

Table 5. Results of the Comparison of the Geriatric Depression Scale Results Between the 2 Groups at T0, T1, and T2 and the T0–T1, T1–T2, and T2–T0 Differences

	Rehabilitation Group	Control Group	<i>t</i> Value	Significance
T0	9.62 ± 3.73 ^a	12.87 ± 4.64	2.378	.145
T1	7.25 ± 3.32	13.00 ± 4.78	7.796	.014
T2	6.50 ± 3.89	14.87 ± 6.03	10.884	.005
T0–T1	–2.37 ± 2.5	0.12 ± 0.35	7.821	.014
T1–T2	–0.75 ± 1.6	1.87 ± 2.16	7.660	.015
T2–T0	–3.12 ± 2.03	2 ± 2.2	23.394	0(ns)

T0 = baseline; T1 = after 2 months of rehabilitation; T2 = after 4 months of rehabilitation.

a. Statistics are mean ± standard deviation.

–2.567; $P = .037$) but not between T0 and T1 ($t = –1$; $P = .351$).

Comparison between groups. There were no differences between the 2 groups at baseline T0 ($t = 2.378$; $P = .145$), but there was a statistically significant difference at T1 ($t = 7.796$; $P = .014$) and at T2 ($t = 10.884$; $P = .005$). There were differences between the 2 groups in Δ GDS score at T0–T1 ($t = 7.821$; $P = .014$) and T1–T2 ($t = 7.66$; $P = .015$) and between T2 and T0 ($t = 23.394$; $P = 0$; Table 5).

Caregiver Results

Of the 16 caregivers, 10 (62.5%) were women and 6 (37.5%) were men; 14 caregivers (87.5%) were retired, and 2 (12.5%) were office clerks. Only 2 (12.5%) reported an unsatisfactory financial situation; the remaining 14 had good financial situations (87.5%).

The caregivers in the rehabilitation group were 2 men (25%) and 6 women (75%), with a mean age of 59 years ($SD \pm 7.8$) and a level of schooling of 8 years ($SD \pm 3.5$). The caregivers in the control group were 4 men (50%) and 4 women (50%), with a mean age of 59 years ($SD \pm 7.8$) and a level of schooling of 8 years ($SD \pm 3.5$).

BSI Results

Intragroup comparison. The results of the Brief Symptom Inventory and Caregiver Burden Inventory are presented in Table 6.

There was a statistically significant difference in Anxiety between T1 and T2 ($t = 2.393$; $P = .048$) and between T0 and T2 ($t = 2.82$; $P = .026$) and in

Table 6. Brief Symptom Inventory and Caregiver Burden Inventory Results

	T0 Mean ± SD	T1 Mean ± SD	T2 Mean ± SD
Rehabilitation group			
Anxiety	8.25 ± 4.94	7.00 ± 5.23	5.50 ± 4.30
Depression	8.62 ± 6.56	6.37 ± 5.31	5.25 ± 4.62
CBI	35.50 ± 17.16	31.37 ± 15.44	27.50 ± 14.67
Control group			
Anxiety	6.75 ± 1.75	6.87 ± 2.03	6.50 ± 2.61
Depression	7.25 ± 2.71	7.50 ± 2.82	7.62 ± 2.77
CBI	34.87 ± 10.97	35.12 ± 11.31	36.50 ± 10.84

T0 = baseline; T1 = after 2 months of rehabilitation; T2 = after 4 months of rehabilitation; CBI = Caregiver Burden Inventory.

Table 7. Results of the Comparison of the Brief Symptom Inventory and Caregiver Burden Inventory Between the 2 Groups at T0–T1, T1–T2, and T2–T0 Differences

	T0–T1	T1–T2	T2–T0
Rehabilitation group			
Anxiety	0.214	0.048	0.026
Depression	0.224	0.185	0.054
CBI	0.382	0.027	0.027
Control group			
Anxiety	0.351	0.14	0.111
Depression	0.17	0.35	0.08
CBI	0.17	0.045	0.014

T0 = baseline; T1 = after 2 months of rehabilitation; T2 = after 4 months of rehabilitation; CBI = Caregiver Burden Inventory.

Depression between T0 and T2 ($t = 2.316$; $P = .054$) in the rehabilitation group. In the control group, there were no differences in Anxiety between T0 and T1 ($t = -1$; $P = .35$), between T1 and T2 ($t = -1.667$; $P = .140$), or between T0 and T2 ($t = -1.821$; $P = .111$), and in Depression between T0 and T1 ($t = -1.528$; $P = .170$), between T1 and T2 ($t = -1$; $P = .351$), and between T0 and T2 ($t = -2.049$; $P = .08$).

Comparison between groups. There were differences between the 2 groups at Δ BSI in the Anxiety score at T0 and T1 ($t = -1.51$; $P = .17$), between T1 and T2 ($t = -2.9$; $P = .014$), and between T2 and T0 ($t = -3.32$; $P = .08$). There were differences at Δ BSI in the Depression score at T0 and T1 ($t = -1.5$; $P = .176$), between T1 and T2 ($t = -2.57$; $P = .035$), and between T2 and T0 ($t = -2.57$; $P = .035$; Table 7).

CBI Results

Intragroup comparison. There was a statistically significant difference between T1 and T2 ($t = 2.779$; $P = .027$) and between T2 and T0 ($t = 2.759$; $P = .027$) but not between T0 and T1 ($t = 0.932$; $P = .382$) in the rehabilitation group. In the control group, there were differences between T1 and T2 ($t = -2.434$; $P = .045$) and between T2 and T0 ($t = -3.265$; $P = .014$), but no difference between T0 and T1 ($t = -1.582$; $P = .17$).

Comparison between groups. There were differences between the 2 groups in Δ CBI scores at T0 and T1 ($t = -0.997$; $P = .35$), between T1 and T2 ($t = -3.49$; $P = .007$), and between T2 and T0 ($t = -3.35$; $P = .011$).

Discussion

Research conducted to date indicates that many intervention techniques for both patients and caregivers are effective in improving certain aspects of dementia. ROT is successful in stabilizing both the patient's cognitive abilities^{17,18} and behavioral status, with an improvement of mood and socialization.^{21,22} Patients participating in programs combining ROT and RT demonstrated improvements in their ability to socialize and, therefore, even their mood.²⁷

Evidence on the effectiveness of psychoeducational approaches is limited to groups engaged in long-term psychoeducational programs. Teri et al³⁰ have shown how important it is for caregivers to be involved in the programs alongside the patients so that they can be taught strategies to engage the patient. A study conducted by Camp and Skrajner⁵² using Resident-Assisted Montessori Programming suggested that procedural learning is available to individuals with mild dementia who, especially if assisted by a professional, can fill the role of volunteers to serve as group leaders for persons with more advanced dementia.

The aim of this study was to assess the effects of a multimodal intervention program for AD patients and their caregivers consisting of rehabilitation (ROT, RT, and occupational therapy) for the patients and psychoeducation for the caregivers. The results indicate that the multimodal rehabilitation program has only limited efficacy, as shown by the MMSE scores. However, the lack of improvement of cognitive function is probably due to the short duration of the rehabilitation program. The level of independence also remained stable in the 2 groups.

The GDS scores decreased in the rehabilitation group, but not in the control group. This finding was interpreted as an improvement in the patients' perception of themselves and of their surroundings. In addition, socialization among the patients in the rehabilitation program increased, and the patients even exhibited spontaneous forms of group support. During the 4 months of treatment, the patients would pair up spontaneously according to level of cognitive impairment, and the patient with better language skills but worse memory skills would always sit next to the one with better memory skills and worse language skills.

During the rehabilitation program, the patients increased their socialization, interacted more with their peers, and created a network of alliances and mutual help. Having identified the difficulties encountered by each group member, the patients often stimulated one another using the rehabilitation activities, without being prompted to do so by the educator. This way, the patients opened up to the others to the point of being able to laugh at their own difficulties. For these patients with a certain degree of awareness of their disorder, the fact of laughing at themselves and interacting with their peers provided a stimulus to take up the challenge. Within a group, each member's difficulties are mitigated by the other members' difficulties, and one's own situation takes on a different connotation. As a consequence, the patients' judgment of themselves and of their abilities and disabilities is integrated into a reference system that accommodates such difficulties rather than rejecting them. The patients are part of a system that contains and supports them, and it is precisely when people feel contained and supported that they are able to best respond to the stimuli provided. This is not to suggest that patients with mild-to-moderate dementia are incapable of leading normal lives at home with their families and maintaining their social roles. To the contrary, it points to the need to promote the creation of facilities where dementia patients are stimulated to preserve their social roles and independence within their families and in the community by means of rehabilitation programs that target both the cognitive and functional aspects of the disease. Before taking part in the psychoeducational program, the caregivers were anxious, depressed, and stressed; these symptoms, in particular anxiety and stress, were reduced after the 16 psychoeducational sessions.

The questionnaire results revealed that most of the caregivers devoted almost all their time to their

demented relative and progressively reduced the number of hours they devoted to themselves. Even when the caregivers are not physically with the patient they continue to think about the patient's needs, leading to a situation of tension and emotional stress, partly supported by the feelings of guilt related to having left the patient alone or with another family member.

The disease is perceived and described with extremely negative, emotionally charged adjectives that reflect the difficulties accepting and understanding the disease. Caring for these patients in the medium-to-long term leads to sadness, hopelessness, distress, irritability, and eventually psychosomatic disorders. Some of the caregivers expressed a desire for the clinical picture to stabilize or improve, whereas severely depressed subjects expressed a desire to be dead. The caregivers' major difficulties were the need to constantly help the patients in daily life activities and the loss of any affective and communicative relationship with the patient.

The caregivers' participation in the meetings was intensely emotional, demonstrating an overwhelming need to talk about their experiences, at times without leaving room for the other participants. In the course of the sessions, there was a substantial and progressive change in some of the participants' attitudes and the way they participated in the meetings; they were more prepared to listen to one another without interrupting to talk about their own distress, and to interact in a calmer and more constructive manner.

All the caregivers benefited from the psychoeducational program, especially once interaction had improved and a rapport had been established among the group components. The possibility of meeting other people with similar problems and sharing one's emotions and feelings reduced the social isolation produced by the number of hours devoted to their sick relatives. Moreover, as well as giving specific and useful information about the disease, the program also provided moral support.

The need for educational, psychological, and social support services is crucial for those caring for relatives with AD, or with dementia in general. These programs should, on the one hand, provide information on the disease and how to manage it and, on the other hand, help the caregivers express their emotions and learn to cope with them. Where possible, these programs should be integrated with cognitive stimulation interventions aimed at the patients.

The results demonstrate the efficacy of such interventions in terms of increasing and preserving the caregivers' coping skills, increasing the use of support services, and increasing the perception of the value of support groups. Managing the disease as a dynamic, constantly evolving process leads to the definition of AD as a "social disease."

Family members are a significant resource in patient management and represent a gateway to the efficacy of treatment and the management and reduction of costs. Achieving caregiver well-being can help reduce the indirect costs related to the caregivers themselves, on the one hand, and on the other hand, delay and avoid institutionalization. The education of caregivers is therefore the most effective strategy to develop this resource and reduce the social costs of the AD.

Thanks to interventions focusing not only on the patient but also on the caregiver, the well-being of both can be effectively improved. This further stresses the need for centers providing patients and caregivers with an environment capable of accommodating and supporting the difficulties of dementia, and to promote the training of personnel specialized in managing both dementia patients (in cognitive and functional terms) and their caregivers (in psychological and educational terms).

There is not only a need for facilities and personnel specialized in both the rehabilitation of dementia patients and the management of the emotions and experience of caregivers but also a need for further research aimed at identifying an increasingly qualified approach to dementia. This kind of work would help reduce the healthcare costs of dementia by devising specific approaches to provide dementia patients and their caregivers with an environment that accommodates and supports them.

A couple of limitations to our study must be acknowledged. The first is the very small number of participants involved. Although our initial sample was fairly large, only a small number of subjects was enrolled in the study because of the difficulty in recruiting patients and caregivers given the high number of weekly sessions and because a larger sample would have required numerous professionals. However, this limitation is common to other studies on the subject^{17,18} and due above all to the difficulty recruiting patients and their caregivers. The second is the very short observation time, which was only 4 months. As a result, we cannot confidently ascribe the results obtained to the multimodal

approach used rather than to the natural course of the disease.

Conclusions

The study demonstrated that the rehabilitation program had limited efficacy on the cognitive and functional aspects of dementia but good efficacy on behavioral aspects and, in particular, depression. This effect may be ascribed to the social interaction provided by the program rather than to the program itself.

Regarding the caregivers, the psychoeducational program proved to be effective in reducing anxiety and depression. This result may be ascribed to better knowledge of the disease and to the opportunity to share experiences of the disease with other people.

Longer term studies conducted on larger and more homogeneous population samples are needed to assess the efficacy of cognitive stimulation programs.

Our decision to use a program that incorporates all 3 techniques described earlier is justified by the fact that each technique addresses a single aspect of the patient's condition. ROT addresses cognitive function, RT targets both amnesic and affective aspects, and occupational therapy improves daily life skills. We should not, however, overlook the fact that socialization itself can lead to improvements. In our view, programs that take a more holistic approach to the individual are more effective than those focusing on cognitive rehabilitation alone. The development of standardized programs involving the participation and collaboration of all rehabilitation professionals can therefore be of great benefit to both the patient and the caregiver.

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