Memory Improvement Program for Elderly Cancer Survivors

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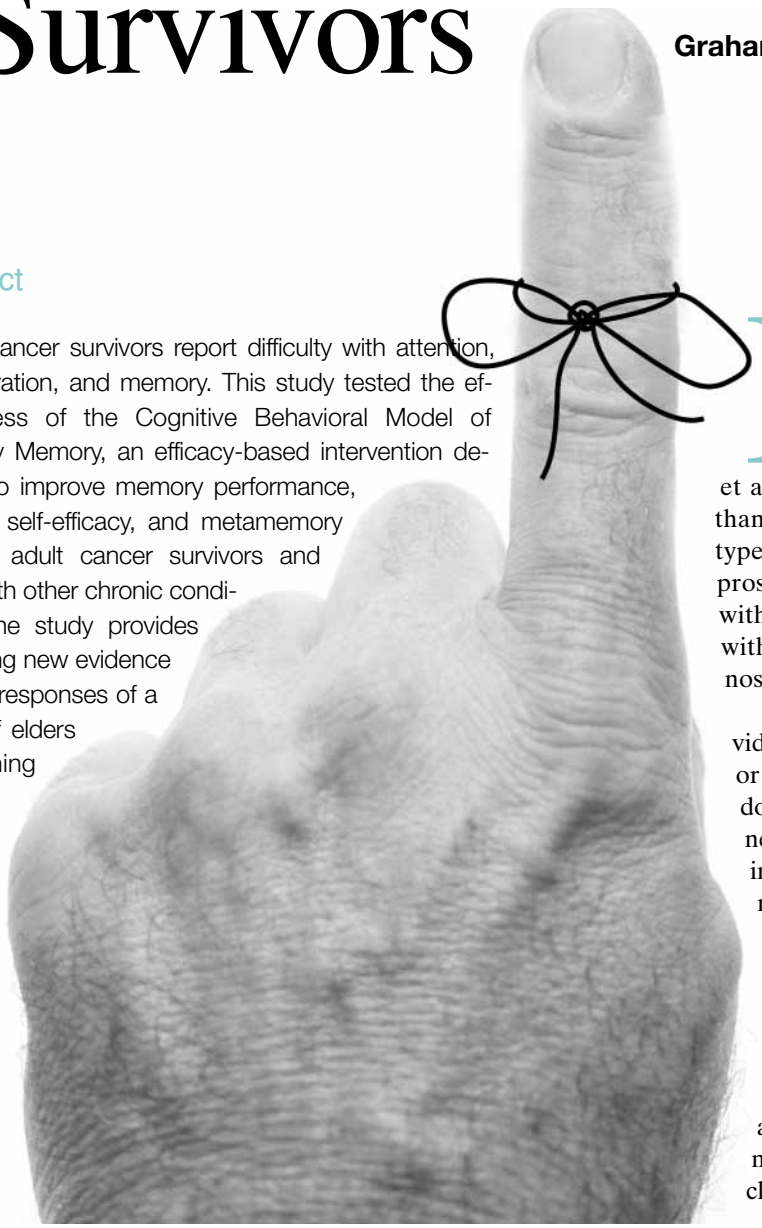

Abstract

Elderly cancer survivors report difficulty with attention, concentration, and memory. This study tested the effectiveness of the Cognitive Behavioral Model of Everyday Memory, an efficacy-based intervention designed to improve memory performance, memory self-efficacy, and metamemory in older adult cancer survivors and those with other chronic conditions. The study provides interesting new evidence that the responses of a group of elders to training varies depending on their health status. (Geriatr Nurs 2001; 22:185-90)

For cancer survivors, maintaining cognitive function is necessary for performing activities of daily living (ADLs) and maintaining quality of life. Indeed, Goodwin et al.[1] followed elderly cancer survivors more than 10 years and found that, regardless of the type of cancer (breast, colon or rectal, and/or prostate), cognitive impairment was associated with poorer survival. In a survey[2] of 421 men with known prostate cancer, recall for diagnostic procedures was less than 20%.

To maintain independent living, an individual requires an intact prospective memory or memory for intentions—remembering to do everyday functions.[3] Three elements are necessary for successful prospective memory: intention to do something in the future, memory of the actual action to be performed, and memory of the scenario in which the action will be performed as intended. Meyers et al.[4] found that baseline verbal memory scores predicted the survival of 80 patients with recurrent brain tumors. Thirty-four elderly women with axillary lymph node negative breast carcinoma who were treated with adjuvant cyclophosphamide/methotrexate/fluorouracil

and 3 years of tamoxifen reported greater concentration and memory problems than matched controls.[5]

The incidence of cognitive dysfunction seems to be greater in elderly cancer survivors than among other elders, and they report difficulty with attention, concentration, and memory.[6,7] For example, in a study of 32 women who underwent surgery for localized (Stage I or II) breast cancer, deficits in attention manifested within 3 days after mastectomy.[8] Their attentional fatigue increased as the number of postsurgery days increased. In another study, recall of information related to treatments and associated risks was poor among 71 elderly women diagnosed with breast cancer. [9]

Recent evidence suggests a dose-effect relationship between the level of chemotherapy and cognitive impairment.[10] In a study of 104 breast carcinoma patients, cognitive impairment was found in 32% of those treated with high-dose chemotherapy, 17% of those treated with standard-dose chemotherapy, and 9% of the control patients.[11] In addition, after 3 years, breast carcinoma patients who had been treated with chemotherapy had significantly more problems with concentration and memory than patients not receiving this treatment. The risk of developing cognitive impairment was 3.5 times higher in patients treated with high-dose chemotherapy. Similarly, in a study of patients with small-cell lung cancer randomized to various treatments, a combination of chemotherapy and radiation therapy had a negative influence on cognitive function.[12]

Cull et al.[7] evaluated memory in adult patients with both Hodgkin's and nonHodgkin's lymphoma who were in remission 6 months after treatment. Subjective memory was determined with the cognitive functioning and global health status subscales of the European Organization for Research and Treatment of Cancer Quality of Life Lung Core Cancer Questionnaire (EORTC QLQ-C 30). Objective memory performance was tested with the Rivermeade Behavioural Memory Test (RBMT).[3] Patients also were queried about their use of internal and external memory strategies in everyday life. Thirty percent reported difficulty concentrating, and 52% reported difficulty remembering. Fifty-seven patients (63%) showed evidence of memory impairment with a screening score of ≤ 9 from the RBMT. The scores of 45 patients (49%) indicated poor memory, and 24 (26%) patients had moderate impairment.

This study tested the effectiveness of the Cognitive-Behavioral Model of Everyday Memory (CBMEM) on memory performance, memory self-efficacy, and metamemory among elderly residents with chronic disorders living in a retirement village.

METHODS

Subjects. Subjects were recruited from a comprehensive retirement community in the Middle West that included 500 independent residents and 135 residents in assisted living. Interested residents were scheduled for pretesting after consent was obtained. The Mini Mental State Examination[13] (MMSE) was used to determine participants' baseline level of cognitive function. The MMSE contains 11 questions with no time limit. Scores can range from 0-30, with a score of 23 or less indicating impairment. Seventy-eight older adults (58 women, 20 men) participated in the study, their average age was 82, and their average MMSE score was 28.

Intervention. The study tested the effects of the CBMEM, an efficacy-based intervention implemented in a 1.25-hour, eight-session, 4-week group intervention. The curriculum was based on Bandura's[14] self-efficacy theory; emphasized health promotion, everyday memory, and memory strategy use; and incorporated skill building through modeling techniques, observing performance, developing awareness, handling mental challenges, and becoming more realistic and less fearful about cognitive aging. The curriculum also emphasized everyday memory components of remembering names, appointments, news articles, face recognition, and future concerns of message and date.[3]

The CBMEM intervention was presented four times over 2 months. The intervention was tested in three groups—two experimental and one wait-list control. Subjects first were randomized into experimental Group 1 (eight classes + Memory Book) and wait-list control Group 3. The control group then was randomized into two groups: Group 2 (Memory Book) and Group 3 (wait-list control). Each participant of the groups received a copy of the book, *Improving Your Memory: How to Remember What You're Starting to Forget*.[15] Group 1 began their classes and received their Memory Book on the first day of class. Group 2 received a book 4 weeks before commencement of their 4 weeks of classes. The two intervention groups, 1 and 2, received the eight-session intervention a month apart. No instructions or feedback was provided to the self-study group during the 4 weeks before they enrolled in the classes. The wait-list control group received the Memory Book on their first day of class, which began the second month at the same time as Memory Book group.

During the second month of classes, memory and control groups were combined based on location of the classes (north or south). The chapters and practice exercises in the book are identical to those used in the memory improvement curriculum taught in the classroom.[16]

Data collection procedures. Pretesting occurred on 3 days of 1 week so that the three groups were tested on separate days but during the same week. Subjects were paid with grocery coupons (total value = $20) for participating in the study. The questionnaires were administered to subjects by master's prepared nurse data collectors and the investigator.

Memory self-efficacy was determined with the 54-item Memory Efficacy Questionnaire, with scores ranging from 0 to 100.[17] Metamemory—the memory components of knowledge, beliefs, and affect—was measured with the 108-item Metamemory in Adulthood Questionnaire (MIA), which

Table 1. Demographic Variables of Four Groups at Pretest (N = 78)

	Arthritis (n = 16)		Cancer (n = 11)		Heart (n = 32)		Other (n = 19)		
	M	SD	M	SD	M	SD	M	SD	*P*
Age	78.71	8.15	84.82	6.79	82.96	6.47	81.20	4.93	.02
Education	14.30	2.83	15.18	3.87	14.68	3.54	14.78	2.02	NS
Cognition	27.65	2.76	27.91	1.70	27.96	1.94	26.95	3.20	NS
Depression	2.12	1.87	2.18	2.71	2.04	2.57	2.30	2.13	NS
Health	8.94	1.60	9.55	2.12	9.33	2.26	9.50	2.16	NS

Table 2. Instrumental Activities of Daily Living Variables of Four Groups at Pretest (N = 78)

	Arthritis (n = 16)		Cancer (n = 11)		Heart (n = 32)		Other (n = 19)		
	M	SD	M	SD	M	SD	M	SD	*P*
Telephone	4.00	.00	3.82	.41	3.92	.35	3.95	.23	NS
Shopping	3.56	.81	3.27	.91	3.43	.90	3.74	.56	NS
Food prep	3.56	.96	2.73	1.27	3.32	1.00	3.58	.77	.03
Housekeep	4.06	1.24	3.55	1.70	4.23	1.13	4.68	.58	.01
Laundry	2.69	.65	2.27	.65	2.60	.71	2.90	.32	.01
Transport	4.44	.73	3.55	1.29	4.19	1.23	4.63	.68	.009
Medications	2.81	.54	2.73	.47	2.87	.40	2.90	.46	NS
Finances	1.19	.54	1.73	.91	1.26	.53	1.05	.23	.01
Total	**26.31**	**3.05**	**23.64**	**4.18**	**25.83**	**4.23**	**27.42**	**2.14**	**.008**

consists of seven subscales that measure strategy, task, capacity, change, anxiety, achievement, and locus.[18] Scores range from 1 to 5.

Depression was ascertained with the 15-item version of the Geriatric Depression Scale;[19,20] scores range from 0 to 15. Health status was assessed by the four-item Health Scale, a subscale of the Multilevel Assessment Instrument.[21] Scores range from 4 to 13. Functional ability was judged by the eight-item Instrumental Activities of Daily Living (IADL) and measured by the IADL scale.[21-23] The IADL has a total of eight items: using the telephone, going shopping, preparing meals, cleaning the house, doing laundry, providing transportation, taking medications, and handling money. Response formats range from a minimum of 3 (finances, laundry, and medications) to 4 (cooking, shopping, and telephoning) to 5 (housekeeping and transportation). Total IADL scores ranged from 3 to 31.

Memory performance. The RBMT test served as the principal memory measure.[3] The test components are remembering a name (first and surname), hidden belonging, appointment, picture recognition, newspaper article, face recognition, new route (immediate), new route (delayed), message, orientation, and date. Each subtest is adjusted so that normal subjects will pass but individuals with everyday memory problems will fail. For each subtest, two scores are produced—a pass/fail screening score and a standardized profile score with a possible score of 0 to 2 (0 points = abnormal; 1 point = borderline; 2 points = normal). Thus each respondent's evaluation results in two summarized scores—a screening score ranging from 0 to 12, and a standardized profile score ranging from 0 to 24. Prospective memory, or remembering to complete an action in the future without the direct assistance of someone else, was tested with three items from the RBMT: remembering to ask for a belonging, ask about an appointment, and deliver a message.

RESULTS

In the overall sample, the participants had many chronic conditions (M = 2.39, SD = 1.27, R = 1-5). For analysis, subjects were divided into four groups by diagnosis: arthritis (n = 16), cancer (n = 11), heart disease (n = 32), and other conditions (n = 19). If participants had more than one chronic disease, they were grouped according to the three chronic disease categories. Those with a diagnosis of cancer made up the smallest group. For example, 42 participants had arthritis, but this diagnosis is not reflected in the size of the group because many people had one of the three grouping diagnoses.

Overall, the participants were relatively healthy octogenarians an average of 82 years old, having an average MMSE score of 28 and 15 years of education, and scoring an average of 9 on the self-perceived health scale. Table 1

Table 3. Memory Variables of Four Groups at Pretest (N = 78)

	Arthritis (n = 16)		Cancer (n = 11)		Heart (n = 32)		Other (n = 19)		
	M	SD	M	SD	M	SD	M	SD	*P*
Memory Eff	47.46	21.1	48.22	19.25	56.68	22.03	46.75	16.66	NS
Memory SP	16.44	5.74	15.78	5.67	15.87	4.74	14.84	5.50	NS
Memory SS	7.06	3.00	6.78	2.95	7.04	2.42	6.42	2.71	NS

Table 4. Means and Standard Deviations of Memory Variables for the Cancer Group

	Pretest		Posttest		
	Mean	SD	Mean	SD	*P*
Memory—screen	6.78	2.95	7.4	3.2	NS
Memory—profile	15.78	5.67	16.80	5.33	NS
Immediate story	1.13	.84	1.34	.92	.006
Delayed story	1.13	.84	1.50	.54	.002
Belonging	.88	.84	1.25	.89	.05
Immediate route	1.63	.74	1.13	.99	.03
Delayed route	1.63	.74	1.00	1.07	.0001
Memory efficacy	48.22	19.25	58.00	18.50	.05
Metamemory change	2.18	0.21	2.50	0.38	.0001

breaks down these demographics. The incidence of depression was 13%. Means and standard deviations and Pearson correlations were computed for all study variables. Using ANOVA, comparisons were made between the four chronic illness groups on all variables. Compared with other participants, the cancer survivors were significantly older ($P = .02$), with a mean age of 84.12.

The cancer group had lower total IADL (M = 23.60, SD = 4.2) scores and lower scores in food preparation, housekeeping, laundry, and transportation than the other three groups, as shown in Table 2. However, cancer group members scored higher on managing their finances than the other three groups. No differences occurred between groups in cognition, education, health, or depression.

As Table 3 indicates, no pretest differences emerged between groups in memory performance (profile and screen) and memory self-efficacy scores. All groups made inconsequential gains in total memory performance scores. Cancer survivors scored significantly lower ($P = .03$) at the pretest on metamemory capacity (M = 2.5, SD = 0.5). No pretest differences existed on the other metamemory scales of achievement, anxiety, change, locus, strategy, and task.

At posttest, significant correlations ($P < .05$) were found between IADLs and memory performance (-.44), metamemory "change" (-.33) and external memory strategy (-.29), and between depression and memory performance (-.31).

Repeated measures ANOVA was calculated for all measures in the cancer group, as illustrated by Table 4. At posttest, significant improvements were noted in memory efficacy (M1 = 48.22, M2 = 58.00) and metamemory change (M1 = 2.18 , M2 = 2.50).

On memory performance, total performance scores did not change from pre- to posttest. Specific memory items from the RBMT test did show changes. The prospective memory item of belonging (M1 = .88, M2 = 1.25) significantly improved. However, even though message improved, it was nonsignificant (M1 = 1.38, M2 = 1.75). In addition, short-term memory scores improved on immediate (M1 = 1.13, M2 = 1.34) and delayed (M1 = 1.13, M2 = 1.50) story recall. On tracing a route in the room, the cancer groups' posttest immediate (M1 = 1.63, M2 = 1.13) and delayed (M1 = 1.63, M2 = 1.00) scores decreased.

DISCUSSION

This study is the first to evaluate the differential benefits of a memory improvement intervention for elders with an emphasis on cancer survivors. Although this study provides interesting new findings, it is limited by the small sample of cancer survivors and the knowledge of their cancer and its treatment. These octogenarians had pretest memory performance scores that were higher than normative scores reported in other studies.[3,24] The cancer survivors made substantial gains in their short-term memory after the intervention. However, after seeing a route demonstrated, the participants scored lower at posttest on their ability to remember to recreate the route on two occasions (immediate and delayed) in a room. The study provides interesting new

evidence regarding functional ability and memory performance. On subjective aspects of memory, memory self-efficacy, and metamemory change, the cancer survivors significantly improved their scores at posttest.

The participants believed that, after the eight classes, they had more confidence in their everyday memory performance and their memories were stable, not declining. These subjective aspects of everyday memory are more difficult to affect than actual performance; however, resultant benefits include reducing an individual's anxiety and improving his or her quality of life.

This study did not aim to improve IADLs. Nevertheless, the significant relationships with aspects of memory indicate that worsening memory negatively affects functional ability. Based on two samples of older adults who participated in the memory intervention, McDougall[16,25] found that the relationship between IADLs and memory performance was complex and often influenced by moderating factors. In a Hispanic sample, depression was associated with impaired IADLs. In an assisted living sample, where the incidence of depression was 26%, depression reduced competence in IADLs, as was memory self-efficacy. Memory performance and IADLs were not related. In this sample, IADLs and memory performance were inversely related. This finding indicates that higher memory scores were positively associated with higher scores on IADLs.

IMPLICATIONS FOR PRACTICE

These participants were highly educated and highly motivated to improve their everyday memories. They believe the best approach to remaining cognitively healthy is through mental exercise. The high motivation and education of the participants operated synergistically. Fifteen percent of the residents in the retirement village signed up for the course, and given their pretest scores, health, and education, their participation and improvement in the memory intervention was not surprising. Many participants began practicing memory exercises before the classes began.

Functional ability, particularly the aspects demanding cognitive capacity (eg, using the telephone, remembering to take medications, managing financial matters, and remembering to turn off the stove after cooking) are of utmost importance. To illustrate, in the recent publication *Older Americans 2000: Key Indicators of Well Being*,[26] of those individuals who had a disability in 1994, 5.1% were institutionalized. In this national study, a person was considered chronically disabled if he or she had one ADL limitation or one IADL limitation, was institutionalized, and if any of those conditions were expected to last 90 days. In the same year, 4.3% of the respondents had disability with IADLs, and 5.8% had limitations with one or two ADLs.

In the retirement village, the administration was concerned with the number of times the fire department was called because a smoke detector alarm had been set off triggering a fire alarm. This concern seems inconsequential, but the costs to the community were enormous because hundreds of apartments in the retirement complex were occupied. The false alarms were caused primarily by individuals forgetting to turn off their stoves before they left their apartments.

This study shows that older adults with various chronic conditions experience differential benefits of memory training in the objective and subjective aspects of cognitive functioning. If early failure in cognitive ability can be improved through intervention, perhaps early decline in functional independence and the need for formal services, such as nursing home placement, can be delayed. In conclusion, it's particularly important to sustain cognitive function in those elders with chronic problems, such as cancer survivors.

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Papaw's Bib

for Charles Stiles, 1905-2000

It is the color of antlers in snow.

To catch the litter of his mouth,
we pinned it to him, an aging hand
towel, soft papyrus ruined daily
with coffee colic, pill shavings, oatmeal croup.

An apron for his chest wall, the cloth
panel bears spotted fever of jelly spittle,
spaghetti sauce, the dew of syrup,
pancakes—anything easily chewed.

Forgive this tapestry of stains
found on the bishop's vestments,
its smell of leakage and talc and whey.
Time is an army of moths, we, the sweater.

I want to be a girl again,
ride his shoulders to the barn.
I want to run after him—my grandfather—
who was ninety-five when he died.

Papaw, you have forgotten your prayer shawl.
I will wave it like this, like this.
Don't you want it?
Don't you need it anymore?

Alone, I sit on his porch swing, stroke
this tufted bib, rubbed bare as a tonsure,
a scrap of Ulysses' sail,
a strip of Moses' robe.

Jeanne Bryner