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Factors Associated with Caregiver Readiness to Use Nonpharmacologic Strategies to Manage Dementia-related Behavioral Symptoms

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Abstract

Background—Nonpharmacologic strategies to manage dementia-related behavioral symptoms depend upon caregiver implementation. Caregivers may vary in readiness to use strategies. We examined characteristics associated with readiness, extent readiness changed during intervention, and predictors of change in readiness.

Methods—Data from a randomized trial involving 119 caregivers in a nonpharmacologic intervention for managing behavioral symptoms. Baseline measures included caregiver, patient, and treatment-related factors. At initial (2 weeks from baseline) and final (16-weeks) intervention sessions, interventionists rated caregiver readiness as pre-action (precontemplation=1; contemplation=2; preparation=3) or action (=4). Ordinal logistic regression identified baseline characteristics associated with initial readiness. Mc Nemar-Bowker test of symmetry described change in readiness; binary logistic regression identified baseline predictors of change in readiness (initial-to-final session). One-way MANOVA identified treatment factors (dose/intensity, number of strategies used, perceived benefits, therapeutic engagement) associated with change in readiness.

Results—At initial intervention session, 67.2% (N=80) of caregivers were in pre-action, 32.8% (N=39) in action. Initial high readiness was associated with better caregiver mood, less financial difficulty, lower patient cognition and more behavioral symptoms. By final session, 72% (N=79) were in action, 28% (N=31) in pre-action; caregivers with less financial difficulty improved in readiness ($B = -.70$, $p = .017$); those in action were more therapeutically engaged ($F\ (2,107) = 3.61$, $p = .030$) and perceived greater intervention benefits ($F\ (2, 88) = 6.06$, $p = .003$).

Conclusion—Whereas patient and caregiver-related factors were associated with initial readiness, financial stability, therapeutic engagement and perceived benefits enhanced probability

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of change. Understanding caregiver readiness and factors associated with its change may be important considerations in nonpharmacologic interventions.

Keywords

Alzheimer's disease; informal caregiving; treatment adherence; intervention

One of the most challenging aspects of caring for individuals with dementia is managing behavioral symptoms. Behavioral symptoms are a hallmark of dementia, almost universal, occur across disease progression, and are associated with high caregiver distress, health care utilization, risk of nursing home placement, and if untreated, rapid disease progression (Beeri *et al*., 2002; Fauth *et al*., 2006; Gitlin *et al*., 2012; Lyketsos *et al*., 2011).

All purpose caregiver interventions have been shown to reduce behavioral symptoms and associated caregiver distress (Brodaty and Arasaratnam, 2012), but the mechanisms by which they do so remain unclear. Most nonpharmacologic interventions are dependent upon families to implement recommended strategies to manage behaviors. Yet, some caregivers may be more "ready" than others to learn about and enact strategies that require behavioral change on their part (e.g., employing different communication strategies), and their readiness may affect participation in and the benefits derived from intervention. Understanding factors associated with caregiver readiness to use nonpharmacologic strategies may enhance the potency and implementation potential of these types of interventions. As dementia is pandemic (Alzheimer's Association, 2012), designing more efficient and effective nonpharmacologic interventions for managing behavioral symptoms remains a public health priority.

This exploratory study examines the construct of readiness among caregivers participating in Project ACT, a trial showing that training families in nonpharmacologic strategies reduced targeted behavioral symptoms and caregiver upset (Gitlin *et al*., 2010b). As an initial foray into understanding readiness, this study posed five basic questions: 1) What was the initial readiness level of caregivers prior to beginning the intervention? 2) What patient and caregiver characteristics at study entry were associated with initial caregiver readiness? 3) Did caregiver readiness change from initial to final intervention sessions? 4) What patient and caregiver characteristics upon study entry predict positive change in readiness level? and 5) What treatment characteristics were associated with positive change in readiness?

Conceptual Framework

To understand caregiver readiness, we employed the Transtheoretical Model (TTM) which poses five incremental stages for adopting new behaviors. In pre-contemplation, individuals do not consider changing their behavior, nor are they aware of the consequences of their behavior. Applied to caregivers, at this stage they may view behaviors as intentional and be unaware how their communications contribute to symptoms. In contemplation, individuals are aware a problem exists and consider how to address it. At this stage, caregivers may understand behavioral symptoms as a disease consequence but not recognize the consequences of their own behaviors. Preparation is characterized by intention to take action, and a positive orientation to behavior change. At this stage, caregivers are ready to develop an action plan such as seeking information or learning about nonpharmacologic strategies. When behavior is consistently modified, individuals are considered in the action stage such as a caregiver who actively uses effective communication strategies. Maintenance occurs when the desired behavioral change is sustained for >six months (Prochaska *et al*., 1992).

There is strong evidence for construct validity of readiness and its stages across a variety of health behaviors (Prochaska et al., 1988; Prochaska et al., 1992; Armitage, 2006; Rhodes and Plotnikoff, 2006; Evers *et al*., 2006; McKibbin, 2007; Carruth *et al*., 2008; Arthur *et al*., 2009; Rose *et al*., 2010).

Factors included in this study were identified from previous research on adherence to medical and lifestyle interventions and caregiving. As caregiver and patient characteristics (age, sex, relationship, education) inform care experiences and disease trajectory, the relationship of these factors to readiness is important to explore, although we did not propose specific hypotheses. For mood, as caregiver depression negatively impacts intervention participation, we expected that depressed caregivers would initially have lower readiness than non-depressed caregivers given the potential behavioral demands on caregivers of nonpharmacologic interventions (Chee *et al*., 2007; Gitlin *et al*., 1999; DiMatteo *et al*., 2000). Alternately, we anticipated that mastery would be associated with higher initial readiness to try new strategies.

For patient factors, as cognitive and behavioral profiles are associated with increased caregiver distress and nursing home placement, we anticipated that caregivers managing more behavioral symptoms and caring for patients with low cognitive abilities would initially have higher readiness. We reasoned that caregivers may perceive an immediate need to obtain new strategies and thus more ready.

As to family resources, social support is associated with better caregiver outcomes and in frail older adults, readiness to use compensatory strategies (Roth *et al*., 2005; Rose *et al*., 2010). We expected caregivers with social support to be more ready initially. Another family resource is finances. Families experience greater financial burden in the presence of behavioral symptoms and financial strain is a predictor of nursing home placement (Spillman and Long, 2009). Financial strain may be associated with initial lower readiness as it may distract caregivers from being able to implement nonpharmacologic strategies.

To examine predictors of change in readiness, the above factors along with treatment processes were considered. Based on research concerning therapeutic processes, we reasoned that more exposure to intervention (dose/intensity), a positive therapeutic relationship, using prescribed strategies and perceiving treatment benefits would result in positive change in readiness level (Chee *et al*., 2007).

Methods

Sample and Procedures

As reported elsewhere (Gitlin *et al*., 2010b), recruitment for trial participation occurred between December 2003 and March 2007 and involved media announcements and mailings by social agencies. Caregivers were eligible who lived with patients having a physician diagnosis of dementia or Mini-mental State Examination score <24 (Folstein *et al*., 1975), were >21 years, English speaking, planning to live in the area for 6 months, not actively seeking nursing home placement, managing behavioral symptoms, and reporting upset (>5 on 10 point scale). Dyads were excluded if either had terminal illness with life expectancy <6 months; active treatments for cancer; >3 acute hospitalizations in past year to assure the sample was physically stable. Also excluded were those involved in another behavioral management trial and patients with schizophrenia or bi-polar disorder, dementia secondary to probable head trauma, or MMSE=0 and bed-bound.

Written informed caregiver consent was obtained at baseline using an institutional approved form. Following baseline, caregivers were randomized to treatment or a no contact control group.

Of 272 dyads, 137 were in intervention of whom 119 were included in this study; five (3.6%) did not complete any sessions; 13 (9.5%) had incomplete data on variables of interest. No large or statistically significant differences in baseline characteristics were found for the 119 included and 18 excluded in this study. Two data sources were used: baseline information and 16-week perceived treatment benefits collected by interviewers masked to group allocation; and caregiver readiness (initial, 16-week treatment sessions), and documentation of each completed session and therapeutic alliance by interventionists (occupational therapists, OT).

Intervention

The intervention involved 12 sessions over 16-weeks. Session helped caregivers identify potential modifying precipitating factors for behaviors targeted as problematic. A range of strategies to manage targeted behaviors (communication techniques, environmental modifications) were taught to caregivers (Gitlin *et al*., 2010b).

Baseline Measures

Basic caregiver demographic characteristics (age, sex, race [white/non-white], relationship to patient [spouse/nonspouse], and education [<high school, high school, >high school] were examined.

Caregiver burden was measured using the Zarit Burden 12-item measure assessing burden from 0=“Never to 4=“Nearly always” (Bedard *et al*., 2001). Scores represented caregivers’ summed responses across 12 items. Higher total scores indicated greater burden (α=.88 for sample).

Upset with behaviors was measured by asking caregivers first whether 23 behaviors occurred (yes/no) in past month using standardized scales (Logsdon *et al*., 1999; Teri *et al*., 1992). For each occurring behavior, caregivers indicated level of bother/upset (0=no upset to 10=extremely upset). A mean upset score was derived by averaging responses across occurring behaviors. Higher scores indicated greater upset (α=.77 for sample).

We measured caregiver perceived improvement or worsening in three domains using the 13-item Perceived Change Index (Gitlin *et al*., 2006): managing care challenges (5-items); affective well-being (4-items), and somatic symptoms (energy, sleep quality; 4-items). For each item, caregivers indicated 1="got much worse" to 5="improved a lot" over past month. Mean scores were computed by averaging across items. Higher scores indicated improvement (α=.74 for sample).

Caregiver depressive symptoms were assessed using the 10-item Center for Epidemiology Studies Depression Scale (Radloff, 1977; Santor and Coyle, 1997). Caregivers indicated extent of symptomatology in past week (0=rarely/never to 3=most or all of time). Scores were summed across items (>8=clinical symptomatology). Higher total scores indicated greater depressive symptomatology (α=.79 for sample).

The Self-Mastery Scale (SMS) measured beliefs about ability to control life outcomes (Pearlin and Schooler, 1978). Caregivers rated agreement with seven statements (e.g., "What happens in life depends on me;") from 1="Disagree a lot to 4="Agree a lot". Higher scores reflected greater mastery (α=.67 for sample).

For patient cognitive status, we used the MMSE, a 30-item screen for cognitive impairment (Folstein *et al*., 1975). Correct responses are summed. Higher scores indicated higher cognitive functioning.

For behaviors (see above), caregivers indicated whether each of 23 behaviors occurred (yes/no) in past month. For each behavior occurring, caregivers indicated frequency. Two scores were calculated: total number and frequency of behaviors.

Family Resources

Social support was measured using 13-items from the NIH Resources for Enhancing Alzheimer's Caregivers Health (Belle *et al*., 2006) that assessed social network size; frequency of contacts; and received support and satisfaction. Scores were summed (0–51). Higher values reflected greater perceived social support (α=.78 for sample).

Caregivers rated difficulty paying for basics (food, housing, medical care, heating) as 1="not difficult at all", 2="not very difficult", 3="somewhat difficult" and 4="very difficult".

Treatment Processes

Five treatment measures were considered; dose (number of completed sessions); intensity (time per session); number of intervention-delivered strategies used by caregivers; perceived benefits (rated by interviewers); and therapeutic relationship rated by interventionists. We used the 14-item Therapeutic Engagement Inventory (Chee *et al*., 2005) to assess openness (5-items), involvement (4-items), and connectedness (5-items); and two additional items to measure strategy use and confidence handling care challenges. Following each session, interventionists rated extent caregivers were engaged therapeutically (0=not at all to 5=extremely). Scores were summed for each session and then across all sessions for a total score. Higher scores reflected greater engagement (alpha=.80 for sample).

For perceived benefits, an 11-item investigator developed survey was conducted by interviewers blinded to group allocation (Gitlin *et al*., 2010b). Items included caregiver satisfaction with study participation and perceived benefits for self and patient. Caregivers responded yes/no or “not at all” to a “great deal” for items. Scores were summed (0–25). Higher values reflected greater perceived benefit (α=.80 for sample).

Readiness Measure

As no readiness scales for nonpharmacologic interventions exist, we developed a rating approach modeled on TTM (Prochaska *et al*., 1992). This involved a two-dimensional measure reflecting caregiver understanding of behaviors as dementia-related, and willingness to try strategies to manage them. We developed behavioral anchors for four readiness levels adapted from behavioral change studies with older adults (Burbank *et al*., 2000; McNulty *et al*., 2003): 1=precontemplation indicating lack of knowledge of dementia and behavioral symptoms, a belief that nothing will help or unwillingness to change; 2=contemplation indicating caregivers acknowledged behavioral symptoms were dementia-related, understood behaviors were not intentional manipulations, were thinking about change but not ready to take action; 3=preparation reflecting awareness that behaviors could be better managed, and intent to try new strategies; 4=action reflecting awareness and active efforts to use new behavioral management strategies. We were not able to evaluate maintenance of behavior change. As only one caregiver was at precontemplation at initial and final intervention sessions, we collapsed stages of precontemplation and contemplation for this study.

OT interventionists rated caregiver readiness at initial (2 weeks from baseline) and final (16-weeks from baseline) treatment sessions. Ratings were based on clinical interviewing and direct observations of caregiver-patient interactions. Scores were reviewed at bi-monthly research team meetings. Interventionists presented cases and readiness score and the team discussed until unanimous agreement was reached. Preliminary evidence supporting the stability (reliability) is suggested by the correlation between initial and final readiness scores (r=.462, p<.001); the validity of our approach is supported in part by a correlation between final readiness scores and engagement in the intervention (r=.204, p=.008).

Data Analysis

We completed four analyses: ordinal logistic regression analysis was used to examine baseline characteristics (caregiver, patient and family resources) and their associations to initial readiness levels; a Mc Nemar-Bowker test of symmetry was used to describe change in readiness from initial to final intervention sessions; binary logistic regression was used to identify baseline predictors of change in caregiver readiness; and multivariate analysis of variance (MANOVA) was used to examine differences among treatment factors as a function of change status. SPSS version 18.0 was used for all analyses.

Results

Sample Demographics

Caregivers had a mean age of 67.5 (*SD*=12.36), were mostly female (79%), white (65.5%) and reported > high school (60.5%) education. Relationship to patient was divided almost evenly between spouse (50.4%) and non-spouse (49.6%). Families were actively managing a high number of behaviors (*M* = 9.32, *SD*+3.80) that occurred with relative frequency per month (*M* = 12.42, *SD*+13.42). Approximately 40% of caregivers had a CES-D score <7, whereas 60% had scores ranging from 8 to 25.

Patients were mostly female (54.6%), with an average age of 82.49 (*SD*+8.74) and MMSE score of 12.79 (*SD*+8.13).

Initial Readiness and Baseline Characteristics

Univariate tests revealed no significant differences among readiness groups for demographic variables. (Table 1)

At initial intervention session, 22.9% (N=27) of caregivers were at precontemplation/ contemplation, 44.5% (N=53) at preparation, and 32.8% (N=39) at action. Thus, 67.2% (N=80) were in pre-action (precontemplation/contemplation, preparation).

Table 2 shows results of an ordinal logistic regression analysis examining associations between initial readiness levels and caregiver-related variables (relationship to patient, burden, upset, mastery, perceived change, depressive symptoms), patient-related variables (MMSE, total number/frequency of behaviors), and family resources (social support, financial difficulty). Although demographic variables were not significant in univariate analyses, we included relationship to patient in this analysis given its strong association with caregiver age ($r=-.53$, $p<.001$), race ($r=.24$, $p<.001$) and patient characteristics (age $r=.43$, $p<.001$; sex $r=-.53$, $p<.001$). Also, previous trials suggest differential treatment effects by relationship (Gitlin *et al*., 2001).

Overall, the model was statistically significant ($p=.008$) and explained 23% variance. Caregivers scoring <8 on CES-D were significantly more likely (*B*=1.23, *SE*=.47; OR=3.42) to be at higher readiness than those with scores ≥8 (depressive symptomatology). Caregivers of patients with low cognitive status were more likely to be at higher readiness (*B*=−.07, *SE*=.03; OR=.93) than those caring for patients with higher cognition. Similarly, caregivers managing more behaviors at baseline were more likely (OR=1.14) to be at higher readiness than those managing less behaviors (*B*=.13, *SE*=.06). Finally, caregivers with less financial difficulty were more likely (OR=.67) to be at higher readiness than those reporting greater financial difficulty (*B*=−.40, *SE*=.20).

Change in Readiness: Initial to Final Intervention Sessions

A total of 110 caregivers had readiness scores at initial and final intervention sessions. The nine missing final readiness scores were equally distributed across groups (3=precontemplation/contemplation, 4=preparation, 2=action). For the 110, similar to the total sample (N=119), 66% (N=73) were in pre-action (precontemplation/contemplation/

preparation), and 34% (N=37) were in action at initial intervention session. By 16-weeks, proportions reversed: 72% (N=79) were in action and 28% (N=31) were in pre-action, a statistically significant shift (χ^2 (3)=47.55, *p*=.001). (Table 3)

Of 73 caregivers initially in pre-action (8=precontemplation/contemplation; 36=preparation), nearly two-thirds (60%) moved to action by final intervention session.

Baseline Factors Predicting Change in Readiness

By final intervention session, there were three groups: those maintaining action from initial to final sessions (*N*=35; 31.8%); those shifting upwards from lower readiness to action (*N*=44; 40.0%); and those remaining in pre-action (*N*=31; 28.2%). Two caregivers who shifted downward (action to pre-action) by final intervention session were placed in the pre-action group. Consistent with prior work (Rose *et al*., 2010), we compared a “no change group,” caregivers beginning in pre-action (precontemplation/contemplation/preparation) who maintained this status at final intervention session (*N*=31) to a “change group,” those beginning in pre-action who moved to action (*N*=44) by final session (N=75). Excluded were caregivers maintaining action from initial to final intervention session (*N*=35). To increase power, we reduced the number of predictor variables to include relationship to patient, financial strain, and factors previously shown to be related to intervention outcomes (Gitlin *et al*, 2010b) or initial readiness (caregiver burden, upset, perceived change, depressive symptoms, patient cognitive status, and number/frequency of behavioral symptoms). These were then entered as baseline predictors in a binary logistic regression (Change/No Change).

The model was statistically significant (*p*=.024), explaining 30% variance. (Table 4) We found only one predictor of change in readiness; caregivers with >financial difficulties were less likely (OR=.50) to improve in readiness level (*B*=−.70, *p*=.017). Spouses were less likely to change in readiness compared to non-spouses, and caregivers managing more behavioral symptoms were more likely to change in readiness than those managing fewer behaviors; however, these relationships did not reach statistical significance (*p*=.057, *p*=.056 respectively).

Treatment Processes Predicting Change in Readiness

Finally, we examined whether treatment processes were associated with change in readiness for the no change group, change group, and those beginning in action and sustaining this status by final treatment session (N=110). (Table 5) Findings showed overall significance (Wilks’ λ=.767, Approximate *F*(10, 168)=2.38, *p*=.012), with significant differences found for therapeutic relationship (*F* (2,107)=3.61, *p*=.030), and perceived treatment benefits (*F* (2, 88)=6.06, *p*=.003). Those who moved to (*M*=49.93, *SD*=5.52) or maintained action status (*M*=49.77, *SD*=5.66) showed >therapeutic engagement than those in pre-action (*M*=46.53, *SD*=6.50); caregivers maintaining action status perceived >treatment benefits (*M*=23.03, *SD*=3.08) than those moving to action (*M*=21.17, *SD*=2.99) or remaining in pre-action (*M*=20.44, *SD*=3.86). Dose, intensity, and using strategies were not predictive of change in readiness.

Discussion

This exploratory study is the first to our knowledge to examine caregiver readiness to use nonpharmacologic behavioral management strategies. Medical bodies endorse nonpharmacologic strategies as front-line treatment for behavioral symptoms (Lyktsos *et al*., 2006). Yet, most approaches depend upon the caregiver to implement strategies. Caregiver readiness to use strategies may impact the clinical viability of nonpharmacologic approaches.

Although caregivers volunteered for the trial and may have been similarly motivated to participate, we found differences in initial readiness level with most in pre-action. Baseline factors associated with higher initial readiness included having lower depressive symptoms and financial strain, and caring for patients with low cognitive status and more behavioral symptoms. Thus, positive caregiver mood and financial stability plus providing care to patients with low cognitive abilities and high behavioral symptomatology characterized caregivers of high initial readiness prior to starting the intervention. Noteworthy is that caregivers with depressive symptoms did volunteer for study participation and that having depressive symptoms did not interfere with the ability to change in readiness level over the course of the intervention. Nevertheless, caregivers with depressive symptoms may benefit from additional services (e.g., counseling) in conjunction with nonpharmacologic interventions (Gitlin *et al*., 1999).

Similarly, financial strain may reduce capacity to attend to the use of nonpharmacologic strategies. Other characteristics (age, race, education, relationship, mastery, upset, burden, behavior frequency, social support), were not associated with initial readiness.

Our findings also suggest that readiness is not a trait, but a malleable state; it is possible to move caregivers from low to higher readiness. No baseline characteristics predicted change in readiness except for financial strain; those improving in readiness had <financial difficulties than those who did not. Thus, financial strain was associated with initial readiness and its change suggesting the importance of attending to this source of distress for caregivers. As financial strain is a primary predictor of nursing home placement (Spillman and Long, 2009), future interventions should address financial needs by providing or referring families to financial counseling or legal services and problem-solving how to manage this aspect of care. Societal-level interventions providing monetary offsets should also be considered.

Those improving in readiness were distinguished from those not improving by being more therapeutically engaged and perceiving greater treatment benefits. Other treatment characteristics (dose, intensity, using strategies) did not differentiate change from no change groups. Thus, consistent with the psychotherapeutic literature, two conditions appeared necessary for improved readiness: attaining positive therapeutic engagement and perceiving treatment benefits (Lambert and Barley, 2001).

Although a majority (72%) changed in readiness, 28% did not. For this latter group, therapeutic engagement and perceived treatment benefits were lower than in the change group suggesting in part, treatment failure. Identifying characteristics of this no change group could inform future interventions. Factors other than those measured here (coping styles, Corcoran, 2011), may distinguish the change from no change groups and should be considered in future studies.

Several study limitations are noted. Readiness was measured by interventionists which may have introduced bias in ratings. The desire to perceive low readiness initially and then gains due to the intervention may have influenced ratings. Nevertheless, this seems unlikely as baseline factors and perceived treatment benefits, collected by independent raters masked to group allocation, differentiated readiness levels.

Another limitation is that readiness was measured using investigator-developed items. Although content validity was achieved with participating OTs prior to study initiation, development of a reliable and valid measure and obtaining independent ratings should be a goal of future research in this area. We do show preliminary construct validity: readiness was associated with treatment process variables and we have used the same measurement approach with other study populations (Rose *et al*., 2010). Finally, as caregivers are volunteers, their readiness levels may be higher than the caregiver population at-large, potentially limiting generalizability of results. Nevertheless, only 32.8% were rated at the highest readiness level initially suggesting that participants may be ready to volunteer for a trial but not necessarily to use nonpharmacologic strategies. Finally, as readiness level was collected on intervention participants, we do not have comparable control group data.

Despite limitations, this study provides preliminary evidence that the construct of readiness is meaningful for examining caregiver participation in a nonpharmacologic intervention. Findings add incrementally to behavioral change research by examining readiness in a new population and factors not previously considered. Furthermore, because readiness is measured at two time points, we augment cross-sectional studies by showing that readiness is responsive to intervention and examining the factors associated with change in behavioral stages.

Findings also contribute to caregiver research by linking patient, caregiver and therapeutic characteristics to readiness. Future research is warranted to determine if tailoring interventions to caregiver readiness reduces attrition and enhances treatment effects.

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Table 1

Descriptive Statistics for Baseline Measures by Initial Readiness Levels of Caregivers (N=119)

	Precontemplation/ Contemplation	**Preparation**	**Action**	***F***	**χ^2**	***p value***	**Total**
Caregiver Characteristics	(N=27)	(N=53)	(N=39)				
Demographics							
Age, Mean ±SD	68.59±14.53	65.43±12.63	68.18±10.27	.82		.442	67.05±12.36
Gender, %							
Male	16.0	36.0	48.0		3.38	.184	21.0
Female	24.5	46.8	28.7				79.0
Race, %							
White	20.5	41.0	38.5		3.35	.189	65.5
Non-White	26.8	51.2	22				34.5
Relationship to Patient, %							
Spouse	25.0	43.3	31.7		3.69	.831	50.4
Non-Spouse	20.3	45.8	33.9				49.6
Education level, %							
< High School	15.4	53.8	30.8		2.06	.726	10.9
High School	29.4	44.1	26.5				28.6
>High School	20.8	43.1	36.1				60.5
Well-Being							
Burden, Mean ±SD	23.81±10.43	19.98 ±9.79	20.49 ±8.75	1.51		.225	21.02± 9.65
Upset, Mean ±SD	6.19± 1.83	5.99 ±2.28	5.28 ±1.75	2.06		.132	5.80± 2.04
Mastery, Mean ±SD	2.62^a± .56	2.93^b ± .58	2.94^b ± .53	3.25		**.043**	2.86± .57
Perceived Change, Mean ±SD	2.50^a± .52	2.86^b ± .60	2.82 ± .55	3.84		**.024**	2.77± .58
Depressive Symptoms, %							
CES-D< 8	8.5	48.9	42.6		9.49	**.009**	39.5
CES-D≥ 8	31.9	47.7	26.4				60.5
Patient Characteristics							
Demographics							
Age, Mean ±SD	82.74± 7.62	82.47± 8.99	82.33± 9.31	.02		.983	82.49± 8.74
Gender, %							

	Precontemplation/ Contemplation	Preparation	Action	*F*	χ^2	*p value*	Total
Male	25.9	38.9	35.2		1.34	.511	45.4
Female	20.0	49.2	30.8				54.6
Cognitive Status, Mean ±SD	16.13± 7.65	12.49± 8.38	11.03± 7.64	3.03		.052	12.79± 8.13
Behaviors							
Total #, Mean ±SD	8.63±3.45	9.17±3.90	10.00±3.86	1.12		.331	9.32±3.80
Frequency, Mean ±SD	13.62±13.12	11.95±14.87	12.23±11.72	.14		.868	12.42±13.42
Family Resources							
Social Support, Mean ±SD	30.30± 7.94	30.72± 8.00	31.23± 8.49	.11		.897	30.79± 8.09
Financial Difficulty, Mean ±SD	2.59^{a}± 1.01	$2.34^{a,b}$ ± 1.06	1.97 ± .93	3.20		**.045**	2.28±1.02

Note: Items in bold indicate significance. Superscripts indicate where significant differences between groups occur: different superscripts = significant differences and identical superscripts = no significant differences. CES-D= Center for Epidemiology Studies Depression Scale

Table 2

Ordinal Regression of Baseline Factors Associated with Initial Readiness Level of Caregivers (N = 112)

	B	SE	Wald	*p Value*[*]	OR Exp(B)	Lower 95% CI Exp(B)	Upper 95% CI Exp (B)
Caregiver Characteristics[¶]							
Relationship[a] (Non-spouse) Spouse	−.28	.42	.44	.508	.76	.34	1.72
Burden	.004	.03	.02	.884	1.00	.96	1.05
Upset	.03	.11	.08	.776	1.03	.84	1.27
Mastery	−.22	.41	.29	.591	.80	.36	1.80
Perceived Change	.05	.40	.02	.899	1.05	.48	2.32
Depression[b] (CES-D ≥8) CES-D < 8	1.23	.47	6.82	**.009**	3.42	1.36	8.58
Patient Characteristics							
Cognitive Status	−.07	.03	7.85	**.005**	.93	.89	.98
Total Behaviors	.13	.06	5.04	**.025**	1.14	1.02	1.28
Frequency of Behaviors	−.01	.02	.80	.371	.99	.96	1.02
Family Resources							
Social Support	.005	.03	.04	.839	1.01	.95	1.04
Financial Difficulty[c]	−.40	.20	4.05	**.044**	.67	.45	.99
<u>Model Fit</u>							
Final −2Log Likelihood	210.93						
Model Chi-Square/df	25.21/11						
Significance	**.008**						
Nagelkerke Psuedo R^2	.23						

[¶] Items in parentheses indicate reference category.

[*] Items in bold indicate significance.

[a] Coded as dichotomous variable: Spouse/Non-Spouse.

[b] Coded as a dichotomous variable: CES-D <8/CES-D≥8. CES-D = Center for Epidemiology Studies Depression Scale

[c] Rated from 1=not difficult at all to 4=very difficult.

Note: For this analysis, seven caregivers were lost due to missing MMSE scores for patients resulting in an N=112. To examine the solution if all caregivers were included, we computed a second ordinal regression using an imputation method such that mean MMSE score of sample was substituted for missing values (Cohen and Cohen, 1983). As the solution was identical to N=112, we report those results.

Table 3

Frequency (%) of Caregivers by Initial and 16-Week Readiness Level (N = 110)

	Readiness at 16-Weeks			
	Precontemplation	**Contemplation**	**Preparation**	**Action**
Initial Readiness Level				
Precontemplation	1 (.9%)	0 (0%)	0 (0%)	0 (0%)
Contemplation	0 (0%)	6 (5.5%)	9 (8.2%)	8 (7.3%)
Preparation	0 (0%)	0 (0%)	13 (11.8%)	36 (32.7%)
Action	0 (0%)	1 (.9%)	1 (.9%)	35 (31.8%)
Totals at 16 Weeks	1 (.9%)	7 (6.4%)	23 (20.9%)	79 (71.8%)

Mc Nemar-Bowker Test $\chi^2(3) = 47.55$, $p = .001$, N = 110

Note: Of 119 caregivers included in this study, 110 had readiness measures at Baseline and 16 weeks. Of the nine lost caregivers, 3 began in Precontemplation/Contemplation, 4 began in Preparation and 2 began in Action.

Table 4

Logistic Regression of Baseline Factors Associated with Change in Readiness (N=75)

Characteristic¶	***B***	**SE**	**Wald**	***p* Value***	**OR Exp(B)**	**Lower 95% CI Exp(B)**	**Upper 95% CI Exp(B)**
Caregiver Characteristics							
Relationship[a] (NonSpouse) Spouse	−1.31	.68	3.64	.057	.27	.07	1.04
Burden	.01	.04	.03	.873	1.00	.94	1.08
Upset	.07	.15	.18	.669	1.07	.79	1.44
Perceived Change	.50	.58	.74	.389	1.65	.53	5.14
Depression[b] (CESD ≥8) CESD < 8	−.82	.72	1.27	.264	.44	.11	1.83
Patient Characteristics							
Cognitive Status	−.01	.04	.02	.878	.99	.93	1.07
Total Number	.17	.09	3.66	.056	1.19	1.0	1.42
Frequency	−.04	.02	2.82	.093	.93	.92	1.00
Family Resources							
Financial Difficulty[c]	−.70	.29	5.74	**.017**	.50	.28	.88
Model Fit							
Final −2Log	82.54						
Likelihood							
Model Chi-Square/df	19.18/9						
Significance	**.024**						
Nagelkerke Psuedo R^2	.30						

¶Items in parentheses indicate reference category.

*Items in bold indicate significance.

[a] Coded as dichotomous variable: Spouse/Non-Spouse.

[b] Coded as a dichotomous variable: CES-D <8 /CES-D≥8.

[c] Rated from 1 = not difficult at all to 4 = very difficult.

Note: This analysis compares caregivers who began in one of the pre-action categories and either maintained this status (N=31) or moved to action (N=44). Those who began in action and remained in action at 16-weeks (N=35) were excluded from the analysis.

Table 5

Mean (SD) Values for Treatment Variables by Change in Readiness from Baseline to 16-Weeks (N=110)

Treatment Variable	Pre-action Baseline/ Pre-action Follow-up (N=31)0	Pre-action Baseline/ Action Follow-up (N=44)	Action Baseline/ Action Follow-up (N=35)
# of Treatment Sessions	11.29 (2.34)	11.66 (1.58)	11.89 (1.58)
Mean Time of Treatment Sessions (Minutes)	52.23 (12.16)	55.80 (14.05)	55.51 (12.72)
Total Strategies Used	49.35 (23.97)	56.43 (21.27)	55.14 (21.91)
Perceived Intervention Benefit[*]	**20.44^a (3.86)**	**21.17^a (2.99)**	**23.03^b (3.08)**
Therapeutic Relationship	**46.53^a (6.50)**	**49.93^b (5.52)**	**49.77^b (5.66)**

Wilks' λ= .767, Approximate *F*(10, 168) = 2.38, *p* = .012.

Note: Items in bold indicate significance on univariate Anovas. Superscripts indicate where significant differences between groups occur: different superscripts = significant differences and identical superscripts =no significant differences.

[*] The sample size for this variable was 91. Of 19 caregivers with missing estimates of intervention benefit, 3 were members of the Pre-action Baseline/Pre-action Follow-up group, 9 were members of the Pre-action Baseline/Action Follow-up group, and 4 were members of the Action Baseline/Action Follow-up Group.