

**Critical Review:
Effectiveness of cognitive stimulation therapy groups for individuals with dementia**

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One of the defining characteristics of dementia is a progressive deterioration in cognitive functioning, a symptom which can have devastating consequences for both individuals with dementia and their caregivers. Consequently, there is increasing interest in therapy approaches aimed at improving or maintaining cognitive performance. Cognitive stimulation therapy (CST) is a group-based therapy for individuals with dementia that has a growing body of evidence showing promising results. This paper critically reviews the effectiveness of cognitive stimulation therapy (CST) groups in treating individuals with dementia. While there is clearly a need for additional research, the five studies included in this review provide moderate evidence for the effectiveness of CST, including improvements in cognition and quality of life, as well as cost-effectiveness. Recommendations for clinical practice as well as for future research are also provided.

Introduction

Dementia is a progressive neurodegenerative disease characterized by global cognitive decline. Memory loss is usually the initial symptom, including deficits in both short-term and long-term memory. Later, higher cognitive functions including language and executive functioning become impaired, often accompanied by behavioural disturbances, personality changes and loss of ability to function (NICE, 2007).

Recent estimates indicate that individuals with communication difficulties associated with dementia represent the fastest growing clinical population treated by speech-language pathologists today (ASHA, 2005). Alzheimer's disease is the most common cause of dementia, accounting for approximately 4.5 million cases in the US. Other common causes include vascular dementia and Lewy Body dementia. Because the incidence of dementia continues to grow as the elderly population increases, further research in effective treatment options is urgently needed (NICE, 2007).

There are three broad categories of intervention approaches for individuals with dementia: pharmacological, cognitive-based, and caregiver training (Chapman, Weiner, Rackley, Hynan, and Zientz, 2004).

There are many types of cognitive-based approaches to treat individuals with dementia. Unfortunately, the literature in this area can be somewhat confusing since the terms "stimulation", "training" and "rehabilitation" are often used interchangeably by some authors and with important distinctions by others. The definitions proposed by Clare and Woods (2004) provide important clarification.

Cognitive training involves repeated practice on specific tasks thought to reflect underlying cognitive processes such as memory and attention. Drill work and explicit "teaching" of cognitive skills is a key component. Tasks may be presented in pen and pencil or computer format and may be offered in individual or group sessions.

Cognitive rehabilitation is an individualized approach that builds on strengths and compensates for areas of weakness in order to enhance an individual's ability to participate more fully in everyday activities.

Cognitive stimulation is an activity-based therapy that draws upon effective elements of a number of therapies including reality orientation and reminiscence therapy. Intervention is provided in a group setting, with focus on global cognitive stimulation, social interaction and implicit learning.

Importantly, cognitive stimulation was the only non-pharmacological approach with sufficient evidence to warrant recommendation by the National Institute for Health and Clinical Excellence (NICE). NICE guidelines for dementia care propose that "People with mild-to-moderate dementia of all types should be given the opportunity to participate in a structured group cognitive stimulation programme. This should be ... offered irrespective of any drug prescribed for the treatment of cognitive symptoms of dementia" (NICE, 2007).

Objectives

The primary objective of this review is to critically evaluate the existing literature regarding the effectiveness of group-based cognitive stimulation therapy for individuals with dementia.

Methods

Search Strategy

A search was conducted in electronic databases including Medline, PubMed, CINAHL, Cochrane Database of Systematic Reviews, and PsychINFO. The search terms used were: 'cognitive stimulation', 'cognitive therapy', 'cognitive rehabilitation' OR 'cognitive stimulation therapy' AND 'dementia' or 'Alzheimer's disease'. In addition, references of articles were reviewed to identify any additional papers not found by the original database search.

Selection Criteria

Only studies delivered in a group format that focused primarily on general cognitive stimulation (regardless of terminology) were included for review. Studies with a focus on cognitive training or cognitive rehabilitation (as defined above) were eliminated, as were studies that combined CST with other modalities such as exercise. There were no limits set on the demographics of research participants or outcome measures.

Data Collection

The results of the literature search yielded three randomized-controlled trials (RCTs) and two retrospective studies. Each study was evaluated for methodological rigour and stated outcomes using a critical appraisal analysis.

Results

Randomized Control Studies:

RCTs are generally considered to provide higher levels of evidence since randomization allows for equal distribution of variables of interest and potentially confounding variables while blinding eliminates researcher bias, and controls allow for comparisons to a similar group.

Spector et. al. (2003) used a large-scale RCT to determine whether cognitive stimulation therapy led to changes in cognitive function and quality of life. Subjects were randomized to either CST twice per week or treatment as usual for seven weeks. A total of 201 participants took part in the study. Appropriate statistical analyses were conducted using analysis of covariance (ANCOVA). At follow-up, the CST group showed a statistically significant improvement in cognition and quality of life. A trend toward improvement in communication was also noted for the treatment group. There were no group differences for the other outcome measures (behaviour, depression, anxiety and global functioning). The authors, however, rightly note that changes to cognition are unlikely to affect functional ability and that behavioural measures

may not be sensitive to detect changes in functional status. A numbers needed to treat analysis allowed for direct comparison to previous studies of five common anti-dementia drugs. They found that for small improvements or no deterioration in cognition, CST is not as effective as standard drug treatment; however for larger changes in cognition, CST did as well or better than 4 out of 5 drug therapies.

The strengths of this study include clear eligibility criteria, a large sample size with adequate power, randomization, use of a control group, and blinding of the assessor. Statistical manipulations appear to be valid, including an intention to treat analysis to adjust for subject attrition. Subjects in both groups appear very similar based on characteristics and baseline scores, however, there is no data to confirm that there are no baseline differences. All of the above factors help to provide strong internal validity for this study.

There are some limitations to this study, which should be noted. Gender differences may have skewed the data toward more favourable outcomes since there was a 4:1 ratio of females in the therapy group and females had significantly better outcomes for a number of key measures including quality of life, communication and reduced dependency. As gender was a significant factor, this distribution may limit the generalizability of the findings. In addition, not controlling the activity of the control may have introduced the possibility of statistical error. Finally, although the results are impressive, no effect sizes are reported, making it difficult to judge the degree of benefit.

This is a well-designed study that provides a moderate level of evidence based on the type of design, baseline characteristics, statistics employed and overall conclusions. Despite the limitations noted above, it provides suggestive to compelling evidence for the effectiveness of CST.

In a subsequent analysis of Spector's study, Woods et. al. (2006) found that improvements in quality of life were not linked to social interaction but rather to improved cognitive function. Specifically, they found no correlation between quality of life and cognitive function at baseline. However, after CST, improvement in quality of life was correlated with improvement in cognition. Data was analyzed using an appropriate multiple regression model. The authors conclude that while quality of life is independent of cognition, therapy to improve cognition can improve quality of life.

Given that this is a retrospective analysis of a well-designed RCT, many of the features enhancing the

internal validity of the original study are also present here; however, conclusions based on retrospective studies are by nature less compelling than those based on prospective studies. Additionally, since no raw data is provided, it is difficult to independently analyze their conclusions.

The statistical analysis for this study was appropriate for normally distributed data, although evidence of normality was not provided. As well, the relationship of the treatment with improved quality of life was greater for the control than the treatment group. Although not discussed by the researchers, this finding raises questions about their interpretation that treatment effects were present for the group as a whole. As well, it is questionable whether the significant results represent a clinically significant change with the treatment effects accounting for only 6% of the variability within the sample.

In light of the above limitations, the evidence from this study should be viewed with some caution. The results are therefore deemed to be equivocal to suggestive.

There has been recent interest in the combined effect of CST with acetyl cholinesterase inhibitors. In an RCT of 54 patients with mild to moderate dementia, Chapman et. al. (2004) compared the effects of cognitive stimulation plus medication (donepezil) to medication alone. Outcome measures were cognitive communication, neuropsychiatric symptoms, functional performance, quality of life and overall global functioning. Results were appropriately analyzed with an ANCOVA with baseline score as the covariate. One-sample t-tests were also conducted. After following subjects for one year, they found that the treatment group showed a slower rate of decline in cognitive function, discourse ability, ability to perform activities of daily living, and overall functioning.

This study showed a moderate level of internal validity due to its clear specification of eligibility criteria, gender distribution, randomization, use of a control, and use of appropriate tests and statistical measures. Power appears to be adequate.

Some caution is warranted though. It appears that subjects volunteered for the study, which could have an impact on the sample representativeness and may also have led to a potential placebo effect, which the authors acknowledge. Also, because subjects were all living at home, the results of the study may not be generalizable to those in residential settings. Subject attrition was appropriately accommodated for with an intention to treat analysis, however, it appears that scores were only carried forward after month 4. At baseline, the

participants did not differ significantly on demographic variables, although the authors acknowledge that the treatment group did have better scores on one of the cognitive measures. The authors also concede that blinding was not always complete.

Cognitive communication was measured as a composite “discourse relevance score” by summing the raw score of three tasks (narrative discourse, procedural discourse and proverb interpretation). By doing so, the researchers have reduced the internal validity of the study and lost potentially important distinctions in types of discourse. Since discourse relevance is an important outcome for a conversationally based therapy, use of a valid and reliable measure may have clarified treatment effects and reduced the possibility of a type II error.

In addition, caregivers in both groups were encouraged to attend education sessions on dementia at the centre conducting the study. Attendance at these sessions may have had an impact on their rating of their own or their family member’s level of distress. Another limitation of this study discussed by the authors is the possibility that increased performance scores arose due to the increased attention paid to those in the CST group. Finally, given that the study was funded by Eisai and Pfizer, the developers and distributors of donepezil, there is a potential for researcher bias.

Given the above noted limitations, the overall validity of the study is suggestive to compelling. However, the overall clinical importance of the study is compelling.

Maintenance of CST benefits:

Previous CST studies have all been fairly short-term. A study by Orrell et. al (2005) examined the long-term benefits of CST by providing an additional 16 weeks of CST to a subgroup of participants from Spector et. al.’s (2003) study. Three conditions were compared: CST + CST maintenance sessions, CST alone and no treatment (control). Outcome measures were cognitive status, quality of life, functional impairment, dependency and communication. Results were appropriately analyzed using a repeated measures ANOVA. Results showed continuous, significant improvement in cognitive function for those who received the maintenance sessions. There was no effect on quality of life, functional ability or communication. The authors conclude that initial cognitive improvement of CST is only sustained when followed by MCST.

This study shows good internal validity in that eligibility criteria was clearly specified, groups were similar at baseline and there was randomization, blinding and use of valid and reliable measures. More than 85% of participants completed the study. The

statistical manipulations and conclusions appear valid.

The main limitation of the study is its small sample size. Because of this, power was insufficient which may have led to a type II statistical error. This may be especially true of quality of life measures, which were significant for the original CST sessions, but non-significant for the MCST sessions. Additionally, although the participants were fairly similar on all measures at baseline, the CST-only group had more communication difficulties, which may have altered results. As well, blinding and randomization were incomplete. Although subjects were randomized in the initial study, those who took part in the maintenance sessions were recruited by voluntary participation, leading to a possible recruitment bias. Another limitation is the fact that no statistical measures were conducted to address subject attrition. For instance, two participants were meant to be in the MCST group, but were too ill to continue. The authors acknowledge a possible element of bias if their physical decline was also accompanied by cognitive decline. Finally, a considerable gender bias was present (97% female), which raises concerns for the generalizability of findings to a wider dementia population.

Given the above limitations, the overall validity of the study is compelling. However, the overall clinical importance of the study is suggestive to compelling.

Cost-effectiveness:

A retrospective study by Knapp et. al. (2006) used the data obtained by Spector et. al. (2003) to determine the cost-effectiveness of a CST program. A cost-effectiveness analysis was conducted to compare service costs between the CST treatment group and the control for 8 weeks to changes in cognition and quality of life. Mean weekly costs of medication, accommodation, and intervention were calculated. An appropriate mixed (repeated measures) ANCOVA was conducted. No significant cost difference was found between the treatment group and the control. Net benefits were calculated and plotted on a cost-effectiveness acceptability curve. The authors conclude that “under reasonable assumptions there appears to be a high probability that CST is more cost-effective than treatment as usual”.

This study lends suggestive to compelling evidence for the effectiveness of CST when effectiveness is extended to a cost-effectiveness analysis.

Some cautions should be kept in mind. The study included data for only 161 of the original 201 participants because service cost data could not be obtained for all subjects. It does not appear that an

intention to treat analysis was used to account for this or the 11 individuals who dropped out of the study. Also, given that the subjects were residents in care homes, the costs may not be comparable in community settings.

Discussion

This paper critically reviewed the effectiveness of cognitive stimulation therapy in clients with dementia. Although there is clearly a need for additional research in this area, the studies included in this review provide a moderate level of evidence for the effectiveness of active cognitive stimulation in clients with mild to moderate dementia.

These studies highlight the challenges of conducting research with individuals with a declining condition. Although results of ‘no change’ may initially appear unimpressive, it should be remembered that this is a positive outcome in clients where decline is expected. For instance, the Mini-Mental State Examination (MMSE) is a common measure of cognitive status. In individuals with Alzheimer’s Disease receiving no intervention, a three point decline per year is expected in MMSE scores (Chapman et. al., 2004). In the Chapman et. al. (2004) study, a mean change of 1.25 point decline was noted for individuals who received both CST and drug therapy, which was a positive outcome.

Chapman et. al. (2004) also had a somewhat surprising finding of later emerging benefits. Although there was no difference in groups at four months post-treatment, benefits in functional ability and discourse skills were found eight months post-treatment. The researchers suggest that later-developing benefits may arise from a slow change in daily habits. This also highlights the need for additional long-term studies of CST.

Recommendations

Future Research:

- Additional large-scale studies need to be conducted to clarify the long-term benefits of CST and how outcomes change once treatment ends.
- Since participation in a long-term group-based therapy program may be an additional burden on families, research should be conducted to determine if similar benefits can be achieved through individual sessions alone or in combination with group sessions.
- Although caregiver stress was an important measure in some of the studies in this paper, none

of the studies incorporated active caregiver involvement. Individualized caregiver training may be an important component in improving outcomes for both individuals with dementia and their caretakers.

- Further research is needed to determine the role that gender may play in successful outcomes.
- Some differences were noted in methodological approaches. A more rigorous definition of cognitive stimulation therapy may be warranted.

Clinical Implications:

As noted by Chapman et. al. (2004), the fact that dementia is a progressive disease should not preclude treatment. Cognitive stimulation therapy may improve functioning of individuals with dementia by focusing on implicit memory skills and targeting multisensory stimulation. The studies included in this review provide evidence that therapy involving meaningful conversations and relevant homework activities may help to keep clients actively engaged and motivated.

Conclusion

There is a growing body of evidence that individuals with dementia may benefit from active cognitive stimulation therapy. This offers hope of delaying the cognitive decline associated with dementia, as well as improving quality of life.

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