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Multisensory Stimulation for Elderly With Dementia: A 24-Week Single-Blind Randomized Controlled Pilot Study

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Background: Dementia in the elderly is a common, debilitating condition. Residents in long-term care facilities present with a number of challenging behaviors. Pharmacological management is not always helpful. Alternative approaches are needed. *Methods:* Multisensory stimulation (MSS) was developed to address sensory stimulation imbalance. In this pilot 24-week single-blinded, randomized controlled study, the authors examined the effect of MSS when given for 12 weeks in either 1 or 3 sessions per week with a control group. *Results:* There is a trend for better outcomes as measured by daily observation scales (DOS) or Clinical Global Impression-Improvement (CGI-I) with the increase of sessions of treatment per week. This became statistically significant at weeks 8 (DOS) and 12 (CGI). This difference continued for 12 additional weeks after treatment ended. *Conclusions:* MSS may be a useful addition to the care of elderly patients with dementia. A larger double-blind randomized control study is required.

Keywords: multisensory stimulation; dementia; elderly; treatment

Introduction

It has been suggested that the elderly living in nursing residences or long-term care facilities may suffer from sensory deprivation or, alternatively, too much sensory stimulation.[1] The average person uses his or her 5 primary senses to interact with and respond to his or her environment. However, in a nursing home environment, it is likely that there is a decreased need to use these senses, and sensory deprivation may occur. Conversely, patients with dementia are thought to have a decreased sensory threshold and can be easily overstimulated.[1] It is speculated that they require sensoristasis, the achievement of a balance in the type and intensity of sensory stimulation they receive.[1,2] Both deprivation and overstimulation can result in unhappiness, annoyance, agitation, depression, and so on, many of which are exhibited by the elderly suffering from dementia.[1,3]

To prevent and reduce these effects, a technique called multisensory stimulation, or interchangeably snoezelen, has been developed, the latter name coming from the combination of the Dutch words meaning *to sniff* and *to doze*. Multisensory stimulation (MSS) was first considered in the 1960s for people suffering from dementia and for children with learning disabilities.[4] According to Chung and Lai,[5] "Snoezelen is commonly employed as a therapeutic modality in dementia care in four areas: (1) reducing maladaptive behaviours and increasing positive behaviours, (2) promoting positive mood and affect, (3) facilitating interaction and communication, (4) promoting a caregiving relationship and reducing caregiving stress."

MSS usually occurs in a room specifically designed for that purpose (sometimes known as snoezelen rooms or snoezelen environments); however,

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MSS has recently been integrated into 24-hour long-term care.[6]

The MSS room is typically dimly lit and includes many objects pertaining to the 5 senses: fiber-optic cables, aroma therapy, different music/sounds, water columns of different colors, textured balls to touch, and screen projectors among others. The snoezelen room is seen as a therapeutic environment for enjoyment, where complex cognitive ability is not required for participation.[7] Certain elements within the room may also confer greater benefits than others, and a study conducted by Hope[8] shows differing responses to stimuli within the multisensory environment among the study population. His results from 29 subjects indicated that the projector, music, and bubble tube were most pleasing to patients and that the vibrating tube and spike ring were least effective. Additionally, aromatherapy and bright light therapy have been shown to help in managing behavioral problems in elderly patients with dementia.[9]

Many qualitative studies have described the value of MSS for patients with dementia.[4] However, there have been very few studies conducted that are experimental and quantitative in nature.

There have been several case series reports suggesting positive effects of MSS. Spaull et al[10] found that in 4 individuals with severe dementia there was a positive behavioral change because of MSS. Similarly, Heyn[11] found that in 13 patients using a multisensory exercise program there was an improvement in the physiological outcome (resting heart rate) as well as mood. Baillon et al[12] found that in 20 patients there was no difference between snoezelen and reminiscence therapy. Unfortunately, her study only assessed 3 sessions over a 2-week period and had no control subjects. Additionally, a nonrandomized analysis of 2 patients by Norberg et al[13] observed that patients react differently to various stimuli and as such care must be taken to provide each patient with the most favorable stimulus and to do so within the patient's optimal comfort level.

There have only been a few published randomized controlled studies on the efficacy of MSS in patients with dementia to date. Baker et al[14] found an improvement in mood and behavior in those patients with MSS and those with general activity sessions. They also found that the positive mood and behavior exhibited with MSS was quickly lost following either treatment. Another randomized control study was conducted by van Weert et al,[6] testing the effectiveness of 24-hour integrated snoezelen care in patients with dementia. They found a significant improvement in apathetic behavior, aggressive and rebellious behavior, and depression. It is important to note that as of 2007, when the most recent review of snoezelen use for dementia was published, there was no evidence showing the efficacy of snoezelen for people with dementia.[5] However, only 4 studies were included in the review, as many did not fit the inclusion criteria of being both randomized and experimental in design.

Hypothesis

The main goal of this pilot study was to examine whether MSS sessions had a beneficial effect on behavior as opposed to care as usual (CAU). This is the first randomized trial (lasting for 24 weeks; 12 weeks treatment and 12 weeks follow-up) comparing different frequencies of treatment (1 session per week vs 3 sessions per week) with a control group receiving CAU. The study was approved by the local research ethics board.

We hypothesized that snoezelen would have a positive effect on mood in elderly patients with dementia, and more so in patients with more snoezelen sessions per week.

Methods

Patient Population

Twenty-one elderly patients with dementia (as diagnosed using *DSM IV* criteria for dementia) residing in a long-term care facility were invited to participate in this study. Written informed consent was provided by immediate family members. During the study, there were 2 deaths and 1 dropout and thus data for the remaining 18 patients were analyzed.

Procedure

The 21 participants were randomly assigned to 1 of 3 groups (Table 1). The control group received no experimental treatment for the entire duration of the study and had only CAU. The second group had 1 snoezelen session per week, and the third group had 3 snoezelen sessions per week for 12 weeks. At the end of the 12-week period, all participants received no snoezelen treatment for another 12 weeks (Figure 1).

Participants in the treatment groups were brought to the snoezelen room and were exposed to MSS.

Table 1. Summary of Patient Information

Group	N	Age (years), Mean ± SD	Age Range	Gender (F/M)	MMSE at Baseline, Mean ± SD	MMSE Week 24, Mean ± SD
Control	6	86.50 ± 5.78	81-92	4/2	3.33 ± 5.74	2.58 ± 4.58
One session per week	5	82.20 ± 7.56	73-92	4/1	5.60 ± 6.26	3.30 ± 3.42
Three sessions per week	7	84.57 ± 5.35	78-94	7/0	6.00 ± 6.43	6.79 ± 6.52
Total	18	84.42 ± 6.23	73-94	15/3	4.98 ± 6.15	4.22 ± 4.84

Abbreviations: SD, standard deviation; MMSE, Mini-Mental State Examination.

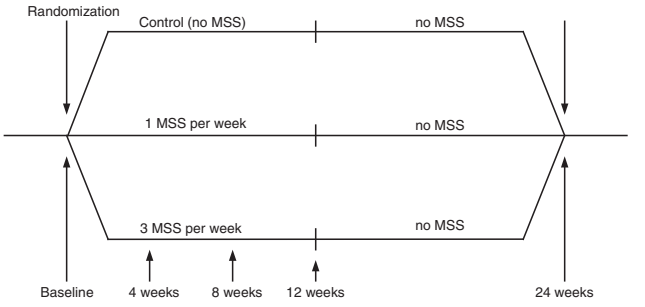

Figure 1. A graphical representation of the study design.

Each session lasted for 30 minutes on a 1:1 basis with a qualified snoezelen facilitator. If at any point participants became unhappy while interacting with something in the room, they were promptly shown something else. If they were disquieted for a prolonged period of time, the session was terminated.

Snoezelen Environment

All snoezelen equipments were purchased through Flaghouse (North York, Ontario, Canada). Items in the snoezelen room included objects such as textured balls, a wall projector, different musical selections, fiber-optic cables, and a color-changing water column. There were 2 reclining chairs, books, and blankets. Aromatherapy was not used in this experiment because of allergy concerns.

Outcome Measures

Each participant was scored on a daily observation scale (DOS) at weeks 0 (baseline), 4, 8, 12, and 24. A score was given for each hour from 8:00 to 20:00. A score of 1 to 8 was given (1 = resident asleep in bed, 2 = resident asleep in chair, 3 = resident awake and calm, 4 = resident agitated, 5 = resident in Life Enrichment Program, 6 = resident engaged with others, 7 = resident sitting alone, and 8 = resident alone in room). For ease of analysis, scores of 5 and 6 were collapsed into a new category with a score of 1, denoting active or engaged with others; scores of 3, 7, and 8 were collapsed into a category with a score of 2, denoting calm and awake; and scores of 1, 2, and 4 were collapsed into a score of 3, representing asleep or agitated. A score of 1 was considered to be the most favorable outcome, whereas a score of 3 was the least favorable outcome.

Clinical Global Impression–Improvement (CGI-I) measures were also completed at weeks 4, 8, 12, and 24 by blinded family members. These were mailed to the family members, who were then asked to rate improvement at their most recent visit compared with the previous visit.

Analysis

DOS score analysis between the 3 groups was performed using 1-way analysis of variance (ANOVA), as the data were normally distributed. The 2 treatment groups were also pooled and analyzed versus the control group to raise power due to our low sample size, and a Student's *t* test was used. CGI-I data were analyzed using a Wilcoxon rank-sums test for nonnormally distributed data, and the same pooling procedure as for DOS score was used. Data analysis was conducted using Statistical Package for Social Sciences (SPSS Version 14.0), Microsoft Office Excel 2007, and JMP IN (Version 5.0 for OS X).

Results

All DOS data were normally distributed and 1-way ANOVAs were performed on time by group data. No significance was found in any of the time periods for any of the groups (1-way ANOVA, degree of freedom

[df] = 2: week 0, $P = .9809$; week 4, $P = .7942$; week 8, $P = .3115$; week 12, $P = .7756$; week 24, $P = .1558$; Figure 2A). Treatment groups were pooled and Student's *t* tests were performed on each (Student's *t* test: week 0, $P = .4230$; week 4, $P = .7477$; week 8, $P = .0421$; week 12, $P = .2842$; week 24, $P = .0219$; Figure 2B). As shown, significance was found at weeks 8 and 24 between pooled treatment groups and the control group.

CGI-I data were looked at between groups for each time period (Figure 3A). At week 4, there was no significant difference between groups (Wilcoxon rank sum, df = 2: $P = .280$). Again at week 8 there was no significant difference between groups (Wilcoxon rank sum, df =2: $P = .849$), at week 12 (Wilcoxon rank sum, df =2: $P = .076$), and finally at week 24 (Wilcoxon rank sum, df =2: $P = .113$). When treatment groups were pooled, significance differences were observed between control and treatment groups at weeks 12 and 24 (Wilcoxon rank sum, df = 1: $P = .0502$ and P = .0371, respectively; Figure 3B).

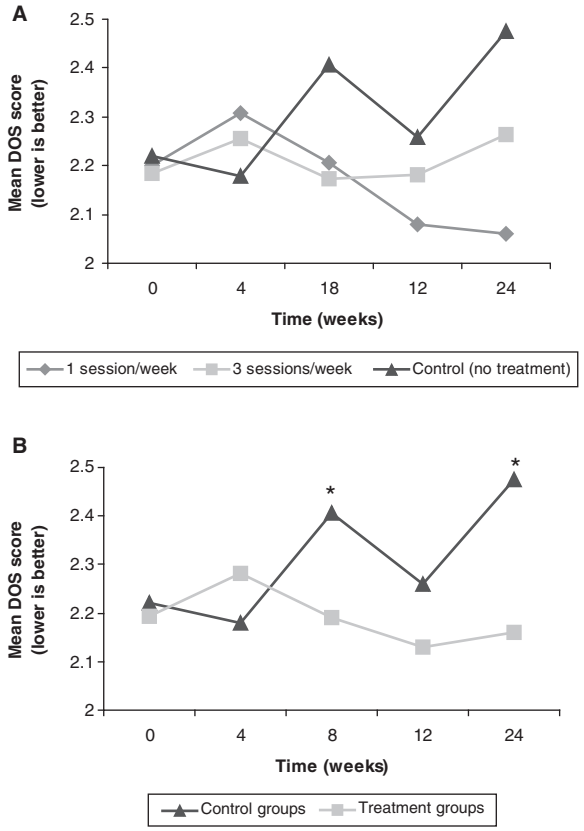

Figure 2. A, Mean DOS score for control patients and those with 1 session and 3 sessions of MSS per week. B, Details when 1 session and 3 sessions are pooled into 1 treatment group.

Discussion

The main findings of this pilot study showed that patients who received 1 and 3 snoezelen treatments per week had a consistently lower DOS mean score (ie, they improved), without much fluctuation when compared with the control group. Even 12 weeks after the cessation of MSS this effect still held. This may be indicative of a protective effect, which MSS can confer for patients with dementia, and needs to be investigated more rigorously.

Additionally, this study provides evidence from blinded family members that following MSS there was a trend of lower CGI-I scores (ie, patients are improving) for those patients having received treatment than for controls.

Future studies could investigate the possibility of protective effects of MSS by once again using blinded family members and, potentially, staff. Both CGI-I and DOS measures can also be used in future experiments. CGI-I has been used extensively in psychiatric assessment, and DOS scores each hour for a 12-hour period can greatly enhance knowledge as to how MSS affects a patient through all hours of the day. In subsequent studies, the Mini-Mental State Examination (MMSE) score should also be taken at the end of the treatment phase, to look at possible cognitive effects of MSS at time of cessation.

As data were difficult to interpret because of the small sample size and heterogeneity of participants (some starting at 0 MMSE, others at 16), pooling of treatment groups was required. In future studies, larger sample sizes should be considered to reduce the chance of making a type II error. The progression of disease can also differ between participants and as such is hard to predict over a 24-week period. Because of the small sample size, good randomization was lacking, as well as sufficient power to statistically confirm the differences between the 2 groups. Another limitation was that the main outcome measure DOS was not performed in a blinded fashion.

Conclusions

Multisensory stimulation may be a useful addition to the care of elderly patients with dementia. A

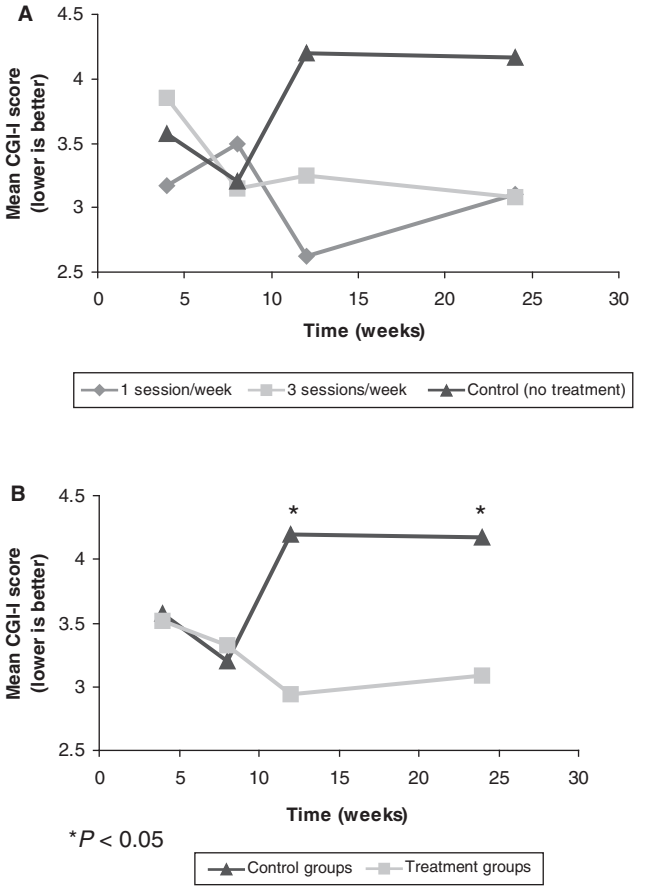

Figure 3. A, Mean CGI-I scores of 1 session, 3 sessions, and control groups. B, Mean CGI-I scores for treatment (1 session and 3 sessions pooled) and control groups as reported by blinded family members over the 24-week experimental period.

larger double-blind randomized control study is required.

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References

1. Kovach CR. Sensoristasis and imbalance in persons with dementia. *J Nurs Scholarsh*. 2000;32:379-384.
2. Gerdner L, Hall G, Buckwalter K. Caregiver training for people with Alzheimer's based on a stress threshold model. *J Nurs Scholarsh*. 1996;28:241-246.
3. Verkaik R, van Weert J, Francke A. The effects of psychosocial methods on depressed, aggressive and apathetic behaviors of people with dementia: a systematic review. *Int J Geriatr Psychiatry*. 2005;20:301-314.
4. Chitsey AM, Haight BK, Jones MM. Snoezelen: a multisensory environmental intervention. *J Gerontol Nurs*. 2002;28:41-49.
5. Chung JCC, Lai CKY. Snoezelen for dementia (review). *Cochrane Database Syst Rev*. 2002;(4):CD003152. doi: 10.1002/14651858.
6. van Weert JCM, van Dulmen AM, Spreenwenberg P, Ribbe MW, Bensing JM. Behavioral and mood effects of snoezelen integrated into 24-hour dementia care. *J Am Geriatr Soc*. 2005;53:24-33.
7. Lancioni G, Cuvo A, O'Reilly M. Snoezelen: an overview of research with people with developmental disabilities and dementia. *Disabil Rehabil*. 2002;24:175-184.
8. Hope K. The effects of multisensory environments on older people with dementia. *J Psychiatr Ment Health Nurs*. 1998;5:377-385.
9. Burns A, Byrne J, Ballard C, Holmes C. Sensory stimulation in dementia. *BMJ*. 2002;325:1312-1313.
10. Spaull D, Leach C, Frampton I. An evaluation of the effects of sensory stimulation with people who have dementia. *Behav Cogn Psychother*. 1998;26:77-86.
11. Heyn P. The effect of a multisensory exercise program on engagement, behavior, and selected physiological indexes in persons with dementia. *Am J Alzheimers Dis Other Demen*. 2003;18:247-251.
12. Baillon S, Diepen E, Prettyman R, Redman J, Rooke N, Campbell R. A comparison of the effects of snoezelen and reminiscence therapy on the agitated behavior of patients with dementia. *Int J Geriatr Psychiatry*. 2004;19:1047-1052.
13. Norberg A, Merlin E, Asplund K. Reactions to music, touch and object presentation in the final stage of dementia: an exploratory study. *J Nurs Sci*. 2003;40:473-479.
14. Baker R, Bell S, Barker E, et al. A randomized controlled trial of the effects of multisensory stimulation (MSS) for people with dementia. *Br J Clin Psychol*. 2001;40:81-96.