Original Article

The effect of Multi Sensory Stimulation (MSS) on cognitive disturbances and quality of Life of male patients with Alzheimer's disease

Mahdi Mahboubinia; Asghar Dalvandi[1], PhD; Kian Nourozi Tabrizi, PhD;
University of Social Welfare and Rehabilitation, Tehran, Iran
Nasrin Mahmoudi, MSc;
Jahrom Medical University, Jahrom, Iran
Shadi Sadat Safavi, MSc;
Saveh Azad University, Saveh, Iran
Samaneh Hosseinzadeh, PhD;
University of Social Welfare and Rehabilitation, Tehran, Iran

Introduction: Alzheimer's disease causes many negative effects on the individual's physical, psychological and cognitive conditions. The multi sensory stimulation helps the patients to improve their physical, psychological and cognitive conditions. The aim of this study is to determine the effect of multi sensory stimulation on cognitive status and quality of life of the patients with Alzheimer's disease which was resident in Nasimshahr elders' center.

Method: In this quasi-experimental research plan samples were divided into experimental and control groups and both of them were tested thrice: before, during and after the intervention. 90 Alzheimer's disease patients were recruited by available sampling technique and with random allocation method the groups were set. Data were collected by demographic questionnaire; geriatric quality of life questionnaire and mini mental status examination (MMSE).The rehabilitation program consisted of 20 session education program and multi sensory stimulation program. The experimental group took part in standardized 45-60 minutes multi sensory stimulation sessions and they received the MMSE and quality of life questionnaires in 10th and 20th sessions and were asked to fill them in. the control group didn't receive any intervention.

Results: The results indicates that the multi sensory stimulation in experimental group improved their quality of life in all dimensions were including physical_ activity (P=0.001), self care (P=0.001), depression and anxiety levels (P=0.001), social function (P=0.001), sexual function (P=0.001), life satisfaction (P=0.001), intellectual_ function (P=0.058) and overall (P=0.001). But in the cognitive status domain no improvement has been observed (P=0.596).

Conclusion: The multi sensory stimulation can be an effective method to improve the general Condition or the signs and symptoms stabilization of Alzheimer's dementia patients. The results of this study show that multi sensory stimulation improves the patients' quality of life and the patients will experience a better life after the intervention.

Key words: Alzheimer's disease, quality of life, cognitive disorder/ status, multi sensory stimulation

Submitted: 03 Jan 2012
Accepted: 17 Feb 2012

Introduction

Among all the senile disease, the cognitive disorder of dementia is the most progressive and destructive condition. Dementia appears with gradual demolition of brain and cognitive status, so it will result in decreasing of individual's quality of life satisfaction and evident deficiencies in elders' self care abilities (1). The prevalence of cognitive disorders after 65 is estimated about 20% and the most prevalent of them is Alzheimer's dementia which includes 50-60% of all of dementias. The diagnostic signs of Alzheimer's disease are sever memory problems and mood disorders like depression which are detectable from the start point of disease to progressed stages (2). Almost all of the patients have the lack of cognitive abilities like memory disorders (3). These disabilities make the patients' past useful activities inefficient with complicated consequences. The persistent depression syndrome may take weeks to years and encompasses a variety of signs and symptoms like decreased interests, excitable mood, grieving, hyper arousal and thinking of death (4).

Alzheimer's disease and depression are strong stressors to patients, their families and caregivers. The people who live with these patients encounter to extensive complex problems which affect their quality of life (5). Every year, millions of dollars spend on caring of Alzheimer patients and in progressed stages it needs more charges (6). The disabilities derived from disease and extraordinary expenses of caring have made specialists to test and try many kinds of curative strategies (7). Biological methods, using various drugs, psychological interventions like family education, daily care centers developments and family psychodynamic interventions to decrease emotional stress of disease have been the most using strategies in recent decades (8). One of these supportive and curative interventions is multi sensory stimulation to improve adaptation process of Alzheimer patients.

The philosophy of sensory stimulation is that the patients with dementia suffer from sensory deprivation and the stimulation can improve the condition. These stimulations can include desirable smells, positive visual pictures, touching and light music (10). Because of the nature of increasing complicated problems of disease, most of the interventions just focus on stabilizing or decreasing the signs and symptoms and many of them have achieved considerable outcomes.

Review of literatures

Modern medical sciences progresses on Alzheimer control and treatments have been remarkable in recent decade and physicians and specialists are more optimistic about that now (11). One of the causes of gradual decline in cognitive status and starting the disease is the lack of stimulations for a long times. Sensory deprivation is common among elders who don't access to stimulatory facilities (12). Baker (2001) illustrates that people suffering from dementia usually live in environments with minimum of stimulations which result in some degree of sensory deprivation (13).

Norberg, Melin and Asplund (2003) state that imperceptible sounds or other patients' voices are inappropriate sensory stimulations which make patients to isolate themselves and decrease their responses to external environment. These will result in decreasing of quality of life and improper relationships to caregivers. Sensory deprivation can make psychological disorders like cognitive problems, anxiety disorders and decreased life satisfaction, so searching the suitable stimulants for patients is necessary(12).

Bower (1997) described that corrupted cognitive status results in damages of sensory stimulants analyzing (9). Baker (2000) stated that caring environments for dementia patients have few stimulants (13). Nowadays, there are many treatments to improve activities of daily living in these patents. Although drugs can relieve many psychological problems, but the drugs using in this disease have an average efficacies on stabilization of the cognitive and behavioral signs and symptoms (14). Side effects and interactions of drugs have made their efficacies questionable (15).

One of the supplementary interventions besides drug therapy is multi sensory stimulation of Snoezelen method, which can postpone the cognitive disorders and improve the quality of life. The theoretical foundation of this method is based on the studies which show the adverse effects of sensory deprivation on normal people (16). In multisensory stimulation (MMS), the dementia patient's face to stimulants by multi senses (17).

The elders not only experience decline in activities levels related to aging and disease but also they live generally in environments without appropriate stimulants (18). Firstly, MMS was used on people with learning ability problems but now it is considered as an efficient plan for dementia patients (19). The stimulation is crucial for normal brain function and sensory deprivation leads to behavioral problems (20).

Multi sensory rooms have been utilized by mental health nursing settings, pain clinics (21) and pediatric settings (22). Bower (1995) remarks that progressive decreasing of neurons in dementia will result in sensory stimulants analyzing problems and misperception of normal stimulants. Martin (2002), Gaffan (2002), Williams (2002) and Pagliano (2002) demonstrated that there is a significant differences in results among elders comparing the others using MMS, but there isn't a holistic study to test the efficacy of this treatment on dementia patients (23).

At first we need to differentiate between the MMS and the other interventions. In this method, visual, auditory, touching and olfactory stimulations are presented in a room by lights, music, smells and touchable objects to patients and they persuade to participate in stimulations. The memory problems are the most important issue for dementia patients, so making them to remember what has done may upset them (24). In MMS the least emphasis is on the temporary memory and it doesn't need to special intellectual attentions.

The "Snoezelen" phrase comes from Netherland and points to look for stimulants to achieve pleasurable peace. It is a unique strategy including active stimulations of all senses by various lights, sounds, smells and tastes (14). The purpose of this method is providing mild sensory stimulations in a non-invasive setting and it doesn't need to excellent cognitive processes like memory or learning (25).

Many studies show that MMS has significant improvements on behaviors of people with learning disabilities. It makes increasing concentration during doing homework (26).

Moffat et al (2002) were the first who investigate the MMS effects on moderate to severe dementia patients resident in King's Park hospital in Netherland. After using several sessions of MMS, caregivers reported that patients are happier and more interested. The patients enjoyed the sessions, reported relaxation and received stimulants (27).

The review of literatures shows that there are few studies about this area and there is no study which has been done in Iran.

The aim of this study was assessing and comparing the quality of life of Alzheimer patients before, during and after multi sensory stimulation in both experimental and control groups.

The first main areas which will be affected by cognitive disorders are quality of life and satisfaction, so the purpose of the study is confirming the efficacy of an intervention which can be utilized by all races and nationalities. These strategies will improve the quality of life and provide an appropriate elders' setting for their leisure times.

Methods

In this quasi-experimental research plan samples were divided into experimental and control groups and both of them were tested thrice: before, during and after the intervention.

90 Alzheimer's disease patients were recruited by available sampling technique and with random allocation method the groups were set.

The elders suffering from Alzheimer's dementia resident in Nasimshahr elders centre in

Tehran was the target population. Based on diagnosis and using the mini mental status examination (MMSE), 90 patients with mild to moderate Alzheimer's disease (MMSE[1]= 10-20) were selected (P=0.95) and considering entry criteria divided into experimental and control groups by random allocation method. The analyzing data showed that the groups are matched.

Entry criteria

- Diagnosis of Alzheimer's disease based on DSM-IV-TR[2] by a psychologist
- MMSE score = 10-20, which detects mild to moderate Alzheimer's disease
- Verbal ability to communicate and appropriate relationships to others
- age>65
- Gender: male

Omission criteria

- Severe Alzheimer's disease and inability to be in public
- Mental retard condition
- The other cognitive disorders like delirium or dementia related to the other reasons
- Epilepsy condition
- Any changes in drug regimen in recent weeks
- the lack of cooperation

Data collection instruments

1- **psychologic records**: the information about disease, signs and symptoms, it's provoke and other existing conditions which are recorded in medical documents were used as a reliable source in gathering data.

2- **Demografic information form**: In this form the demographic, educational, occupational, social, supportive and curative information were filled in.

3- **Mini Mental Status Examination questionnaire (MMSE)**: This questionnaire assesses the orientation, concentration, attention, perception and calculation abilities. The maximum score is 30 and the bands lower than 25 indicate eventual cognition destruction and lower than 20 show definite ones. MMSE designed by Fowl Stain in 1975 firstly and it is generally used for screening the cognitive disorders (29).

4- **Elders' quality of life questionnaire**: De Leo et al (1998) designed this questionnaire and it was tested in Leiden (Netherland), Padua (Italy) and Helsinki (Finland). This is an international instrument which can be used easily in all elders groups in all over the world (29).the quality of life is considered as one of the assessment criteria in caring process of Alzheimer patients (30). The purpose of this questionnaire is providing

1. Mini Mental Status Examination

2. Diagnostic and statistical manual of mental disorder 4th edition text revised

information about the disease effects on patients' life(31). It includes 31 questions in 7 dimensions: physical functions (5 questions), self care (6 questions), depression and anxiety (4 questions), intellectual functions(5 questions)social functions (3 questions), sexual functions (2 questions) and life satisfaction (6 questions).this questionnaire is Likert based method and each question has 4 scale includes 0 (the worst) and 3 (the best), so the total score would be between 0 (the worst) and 93 (the best). The main dimensions of questions are not addressed and the order of them is mixed.

Implementation

By management permission, the purposeful sampling was done on Nasimshahr elders' centre. The demographic information form, MMSE and quality of life questionnaire were filled in for each sample. Based on MMSE scores (10-20), samples were matched and divided to experimental and control groups. The care plan was presented just too experimental group and the control group didn't receive any intervention. Before the plan, some details about the plan were demonstrated to patients.

The multi sensory stimulation sessions (20 sessions) were designed in the mornings and afternoons. Just 3 patients didn't participate in any sessions and 2 patients participated in 12 sessions and 1 patient participated in 16 sessions.

The sessions were based on standardized 45-60 minutes unguided strategy to stimulate all senses of patients. The room was decorated by simple colored papers and comfortable chairs arranged there. The lights were making different shapes on the walls. Light music was playing and two beds were set in two sides of saloon for massaging. The beds were covered by screen and the person who was getting massage could see the saloon but the others couldn't see him. Some fragrance sprayed and based on participants' opinions some poems were selected to read. At the first of session they got a slice of healthy dried plum. The patients with auditory problems wanted to sit in front of the others. The afternoon sessions started at 4 pm and the only difference with the morning sessions was massaging. Each participant received 3 to 4 minute massage by a physiotherapist in every session. The patients got the MMSE and quality of life questionnaire in 10_{th} and 20_{th} sessions and they were asked to answer the questions carefully.

Research limitation

The samples were recruited from just a centre and they were all male and suffered from Alzheimer's dementia, so the results can't be generalized to the other patients with the other kind of the dementias. The elders' physical and mental conditions during filling in the questionnaire can affect on answers and it's uncontrollable.

Ethical issues

The purpose and method of research were explained to samples and data collection was done by their consent. The samples' information was kept private and the questionnaire didn't need to address samples' names. All of the samples were free to leave the plan and there were no compulsion. The control group received information about the multi sensory stimulation advantages. The findings were presented to officials.

Findings

To investigate whether the distribution of variables is normal, the Kolmogorov Smirnov test was used. The non-parametric Wilcoxon tests detected matching between experimental and control groups. To compare means of answers to each question of quality of life questionnaire in both groups the Friedman test was used and if there was found any significance in means the Wilcoxon test was done. The mean of answers of experimental and control groups were compared by Mann-Whitney U test.

Table 1. Comparing the quality of life by groups and time of assessments

Group	Experimental		Control		Mann Whitney U Test	Probability
	Mean	Variance	Mean	Variance		
Before intervention	30.02	12.11	31.8	9.34	942	0.565
During intervention	40.53	8.02	32.08	8.51	457.5	<0.001
After intervention	39.95	6.90	32.02	8.06	443.5	<0.001
The probability	<0.001		0.82			

The results indicates that the multi sensory stimulation in experimental group improved their quality of life in all dimensions were including physical_ activity (P=0.001), self care (P=0.001), depression and anxiety levels (P=0.001), social function (P=0.001), sexual function (P=0.001), life

satisfaction (P=0.001), intellectual_ function (P=0.058) and overall (P=0.001) But in the cognitive status domain no improvement has been observed (P=0.596).

Table 2. Paired comparing of quality of life in experimental group

	Time	Mean differences	probability
Experimental group	Before and after	-9.18	<0.001
	During and after	-0.58	0.068
	Before and after	9.76	<0.001

Discussion

The patients suffering from Alzheimer's dementia generally know learning and problem solving processes as hard tasks. The memory and concentration problems and following the regulations difficulties make learning and cognitive disabilities. These problems in
Alzheimer's patients create daily living disorders and will decrease quality of life (33). There are a lot of interventions like drugs, nutrition and multi sensory stimulation to improve the quality of life (34).
The quality of life is the subjective feeling of welfare and peace in all aspects of life, the ability of effective coping to problems and satisfaction of self abilities (38). It is a complex concept and it's different in person to person. The explanation of quality of life depends on values, experiences and subjective bonds. It's a relative context and influenced by place and time, therefore we cannot find any absolute and universal definition for it. It has some objective aspects and is dependant to external conditions, but in general it's an internal and subjective concept and individual's perceptions and imaginations of life conditions affect on the meaning of the quality of life (36).
The research hypothesis was that the multi sensory stimulation has positive effects on patients' quality of life. The findings confirmed the hypothesis. The patients reported increasing in their quality of life scores and life satisfaction. The other studies confirm these Findings. Baker in his study about dementia patients and assessment the effects of multi sensory stimulation on quality of life found similar results. In his study the mood and behavior status after multi sensory stimulation were improved. The anxiety was decreased and the patients were more active and happier after intervention and they showed more attention to their environment (16). Boote et al showed that multi sensory stimulation has the most efficacy and it is a very effective strategy to improve the dementia's patients status(38).The findings of Hope (10), Norberg and Asplund (25), Long (18), Ashby (39) and
Pagliano (23) studies confirm the research hypothesis too.

Conclusion

The multi sensory stimulation can be an effective method to improve the general condition or the signs and symptoms stabilization of Alzheimer's dementia patients. The results of this study show that multi sensory stimulation improves the patients' quality of life and the patients will experience a better life after the intervention.
The nurses can use this method to improve physical activities, self-care, intellectual function and finally life satisfaction. So, they will be able to make a better quality of life for elders with dementia. The self-care is one of the most important strategies among healthy behaviors.
The elders' participation in their own self-care is crucial and keeps them independent. The elder should select a desirable environment to improve his abilities. The multi sensory stimulation method makes the elders to experience a better life.

Acknowledgment:

We acknowledge all of the nursing professors and administer of University of Welfare and Rehabilitation Sciences of Tehran for their virtual and material supports. The authors appreciate the Nasimshahr elders' centre managers and respectable elders resident there who assist us in this study.

References

1. Shimer P. (Alzheimer's disease). ARjmand M. (Persian translator).Tehran: Nasle Farda Publisher; 2002.
2. Davis RN, Massman PJ, Doody RS. Cognitive intervention in Alzheimer disease: a randomized placebo-controlled study. Alzheimer Dis Assoc Disord. 2001;15(1):1–9.
3. Smith CA, Collins CT, Cyna AM, Crowther CA. Complementary and alternative therapies for pain management in labour. Cochrane Database Syst Rev Online. 2006;(4):CD003521.
4. Haggar L. A short training package for care staff using Snoezelen environments with Profoundly and Multiply Disabled Clients: Design, Implementation and Evaluation. Sensations Disabil Sens Environ Leis Snoezelen Educ Ther. 1994;49–87.
5. Smith C, Collins C, Cyna A, Crowther C. Complementary and alternative therapies for pain management in labour. The Cochrane Database Syst Rev.2006 ;18(4):CD003521
6. Loew CA, Silverstone BM. A program of intensified stimulation and response facilitation for the senile aged. The

Gerontologist. 1971;11(4 Part 1):341–7.
7. Davison GC, Neale JM, Krince AN. Abnormal psychology. New York: john Wiley & sons;2004.
8. Sadock B, Kaplan H. (Kaplan & sadocks synopsis of psychiatry behavioral sciences).Poor Afkar N.(Persian translator). Tehran: Shahrab Publisher;2001.
9. Kok W, Pater J, Choufour J. Snoezelen. Amsterdam: Bernardus Expertisecentrum/Fontis, 2000.
10. Hope K. Using multi-sensory environments with older people with dementia. J Adv Nurs. 1997;25(4):780–5.
11. Moore A, Harris G, Stephens J. People with a disability–Therapists and sensory activity. In: Hutchinson R, Kewin J, editors. Sensations & Disability: Sensory environments for leisure, Snoezelen, Education & Therapy. Chesterfield Derbyshire: Rompa; 1994,pp:88-108.
12. Kaplan H, Sadock B. Synopsis of psychiatry. 9th edition. New York: J.B.Lippincott; 2003,pp: 535-70.
13. Norberg A, Melin E, Asplund K. Reactions to music, touch and object presentation in the final stage of dementia: an exploratory study. International Journal of Nursing Studies (1986), 23, 315-323. Int J Nurs Stud. 2003;40(5):473–479; discussion 481–485.
14. Solomon P, Kubzonsky P, Liederman P, Mendelson J, Trumbull R, Wexler D, et al. Sensory deprivation: A Symposium Held at Harvard Medical School. Cambridge, MA: Harvard University Press; 2001
15. Martin NT, Gaffan EA, Williams T. Behavioural effects of long-term multi-sensory stimulation. Br J Clin Psychol Br Psychol Soc. 1998;37 (Pt 1):69–82.
16. Baker R, Bell S, Baker E, Gibson S, Holloway J, Pearce R, et al. A randomized controlled trial of the effects of multi-sensory stimulation (MSS) for people with dementia. Br J Clin Psychol Br Psychol Soc. 2001;40(Pt 1):81–96.
17. Hutchinson R, Haggar L. The development and evaluation of a Snoezelen leisure resource for people with severe multiple disability. Sensations Disabil Sens Environ Leis Snoezelen Educ Ther. 1994;18–48.
18. Long AP, Haig L. How do clients benefit from Snoezelen? An exploratory study. Br J Occup Ther.1992; 55:103-6.
19. Murray LL, Dickerson S, Lichtenberger B, Cox C. Effects of toy stimulation on the cognitive, communicative, and emotional functioning of adults in the middle stages of Alzheimer's disease. J Commun Disord. 2003;36(2):101–27.
20. Hogg J, Cavet J, Lambe L, Smeddle M. The use of "Snoezelen"as multisensory stimulation with people with intellectual disabilities: a review of the research. Res Dev Disabil. 2001;22(5):353–72.
21. Reid L, Louise M. The effectiveness of Snoezelen Therapy to decrease anxiety and restlessness in nursing home residents. Australas J Ageing.2005;24: 42-A43.
22. Shapiro M, Parush S, Green M, Roth D. The efficacy of the "Snoezelen" in the management of children with mental retardation who exhibit maladaptive behaviors. Brit J Dev Disabil1997; 43(2):140-155.
23. Pagliano P. Using a Multi-sensory Environments: A practical guide for teachers. London: David Fulton;2001,pp: 50-110.
24. Staal JA, Sacks A, Matheis R, Collier L, Calia T, Hanif H, et al. The effects of Snoezelen (multi-sensory behavior therapy) and psychiatric care on agitation, apathy, and activities of daily living in dementia patients on a short term geriatric psychiatric inpatient unit. Int J Psychiatry Med. 2007;37(4):357–70.
25. Thompson SB, Martin S. Making sense of multisensory rooms for people with learning disabilities. Br J Occup Ther. 1994;57(9):341–4.
26. Fava L, Strauss K. Multi-sensory rooms: comparing effects of the Snoezelen and the Stimulus Preference environment on the behavior of adults with profound mental retardation. Res Dev Disabil. 2010;31(1):160–71.
27. Moffat N, Barker P, Pinkney L, Garside M, Freeman C. Snoezelen: An experience for people with dementia. Chesterfield: rompa; 2002.
28. Human H. [Scientific knowledge in behavioral sciences (Persian)]. Tehran. Peyke Farhang Publisher; 2004.
29. Alipoor F, Sajjadi H, Foroozan A. [Elders, quality of life in Tehran (Persian)]. Iran Geriatric Journal.2009;3(9)
30. Buono MD, Urciuoli O, De Leo D. Quality of life and longevity: a study of centenarians. Age Ageing. 1998;27(2):207–16.
31. Sarvimaki A, Stenbock Hult B. Quality of life in old age described as a sense of well-being, meaning and value. J Adv Nurs. 2000;32(4):1025–33.
32. Fassino S, Leombruni P, Abbate Daga G, Brustolin A, Rovera GG, Fabris F. Quality of life in dependent older adults living at home. Arch Gerontol Geriatr. 2002;35(1):9–20.
33. Hesam Zadeh A, Maddah S. [Comparing the quality of life between elders resident at home and elder centers in Tehran (Persian)]. Thesis for Master of Science. The University of Welfare and Rehabilitation Science;2002.
34. Condello C, Padoani W, Uguzzoni U, Caon F, De Leo D. Personality disorders and self-perceived quality of life in an elderly psychiatric outpatient population. Psychopathology. 2003;36(2):78–83.
35. Singh NN, Lancioni GE, Winton AS, Molina EJ, Sage M, Brown S, et al. Effects of Snoezelen room, Activities of Daily Living skills training, and Vocational skills training on aggression and self-injury by adults with mental retardation and mental illness. Res Dev Disabil. 2004;25(3):285–93.
36. Clark PG. Quality of life, values, and teamwork in geriatric care: do we communicate what we mean? Gerontologist. 1995;35(3):402–11.
37. Conger SA, Moore KD. Chronic illness and quality of life: the social workers role.New York: TSAO foundation; 2002, pp:1.
38. Boote J, Lewin V, Beverley C, Bates J. Psychosocial interventions for people with moderate to severe dementia: A systematic review. Clin Eff Nurs. 2006;9, S 1:e1–e15.
39. Ashby M, Lindsay WR, Pitcaithly D, Broxholme S, Geelen N. Snoezelen: its effects on concentration and responsiveness in people with profound multiple handicaps. Br J Occup Ther. 1995;58(7):303–6.