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Effectiveness of Multi-Sensory Intervention (MSI) on Agitation among Older Adults with Dementia

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Abstract

Aim: The study aims to determine effectiveness of multisensory intervention (MSI) on agitation among older adults with dementia.

Materials and Methods: An RCT were performed in investigation, which involved sixty older persons who has dementia ranging from mild to moderate.Based on inclusion as well as exclusion criteria, participants were chosen from Chettinad Health and Research Institute. The subjects was categorized to control and experimental groups randomly. For four weeks, experimental group was given a multisensory intervention that included 30-minute sessions, three times a week, of visual and auditory stimulation through nature-based slideshow videos and soothing classical music. The control group carried on with their standard medical care. CMAI tool were taken for measuring levels of neuropsychiatric symptoms both before as well as after intervention. SPSS were utilized for analyzing gathered informations.

Result: Findings in test result revealed an remarkable lowering severity of agitation within older adults with dementia who received multisensory treatment in contrast with control group. Experimental group displayed progress on behavior-related responses and reduction in agitated behaviors following the four-week intervention program.

Conclusion: According to the study's findings, multisensory intervention is a successful non-pharmacological strategy for lowering agitation in elderly dementia patients. Relaxation, better emotional control, and improved behavioural reactions were all encouraged by the intervention. Therefore, multisensory intervention can be regarded as a useful occupational therapy technique for controlling neuropsychiatric symptoms as well as enhancing QOL in dementia populations

Keywords: Dementia, Agitation, Multisensory Intervention,, Occupational Therapy, Cohen–Mansfield Agitation Inventory

1 Introduction

Agitation is one of the most frequently observed behavioral disturbances in older adults and is often seen in community and institutional settings. It is generally characterised by inordinate motor exertion, emotional torture or verbal and physical aggression that appears disproportionate to the girding terrain.

Signs of agitation might include pacing, restlessness, crying, repeatedly asking questions, resisting care, or acting aggressively towards others. These acts are often deemed disruptive and may greatly interfere with the diurnal functioning and social relations of aged adults. [1]

Agitation is not one single act, but rather a spectrum of behavioral and emotional responses that can be triggered by a variety of internal and external factors. Physiological factors that can cause agitation in aged adults include pain, infection, drug side effects, or sleep disturbances. Cerebral states such as anxiety, fear, frustration or loneliness can also precipitate agitated behavior. Environmental factors such as excessive noise, strange surroundings, overstimulation, or changes in routine may also contribute to agitation [2]. Agitation, one of the most distressing neuropsychiatric symptoms of dementia, is a common symptom in aged adults. Agitation behaviors are commonly classified as either physical or verbal in nature and may be further classified as aggressive or non-aggressive. The circumstance and inflexibility of agitation could vary with level of Dementia [3].

Because of aging the world's population, dementia has become much more common in recent decades. Dementia is far more common as people age, especially those who are 65 years of age and beyond [4]. It is associated with an increased risk of institutionalisation, decreased quality of life and a greater functional decline. Caregivers of patients with continuous agitation often experience significant emotional stress, exhaustion, and burnout. Agitation may also interfere with normal care activities, medical treatment and rehabilitation programmes [5].

Multisensory stimulation (MSI) refers to therapeutic interventions that provide controlled stimulation to multiple sensory modalities, including the visual, auditory, tactile, olfactory, and gustatory senses. These interventions are typically delivered in a calm and structured environment using sensory inputs such as soft lighting, music, pleasant scents, textured objects, and flavored foods. MSI aims to promote relaxation, emotional comfort, sensory engagement, and improved behavioral responses among older adults with dementia [6].

Multisensory treatments are used by occupational therapists as therapeutic modalities to provide sensory input in a controlled environment which promotes relaxation, emotional regulation and improved behavioural responses.Such therapies may include calming music, tactile objects, aromatherapy, visual lighting effects, or sensory-rich environments that stimulate multiple sensory pathways simultaneously. Occupational therapists use multimodal stimulation as part of meaningful activities and daily routines to enhance attention and engagement, reduce agitation and increase participation in everyday activities for older persons with dementia. These interventions are based on the principles of holistic care, environmental adaptation and child-centered intervention planning of occupational therapy and aim to promote functional independence and well-being [7].

2. Related Literature

Cohen-Mansfield (1995) and Kales et al. (2015) identified agitation as one of the most common and distressing neuropsychiatric symptoms among older adults with dementia. It is characterized by restlessness, emotional distress, and verbal or physical aggression, and is associated with increased caregiver burden, reduced quality of life, greater healthcare utilization, and early institutionalization. Sensory deficits and impaired sensory processing have also been recognized as important contributors to agitation in this population (Cosh et al., 2019).

Baker et al. (2003) reported that multisensory stimulation is a promising non-pharmacological intervention for managing behavioral symptoms in dementia. By providing controlled visual, auditory,

tactile, and olfactory stimuli, multisensory approaches create a calming environment that promotes engagement, emotional well-being, and positive behavioral responses. Similar findings have been reported by van Weert et al. (2005) and Cheng et al. (2019).

Staal et al. (2007) demonstrated that multisensory interventions can effectively reduce agitation and disruptive behaviors among individuals with dementia. Sensory-based approaches such as tactile stimulation, music therapy, and aromatherapy have been associated with improved emotional regulation and behavioral outcomes (Livingston et al., 2014; Strøm et al., 2016).

According to Gitlin et al. (2010), sensory-based interventions represent an effective person-centered approach for managing agitation in dementia. Meaningful activities, individualized sensory experiences, and environmental modifications have been shown to reduce behavioral symptoms while enhancing participation, functional independence, and quality of life among older adults with dementia (Kolanowski et al., 2011; Cheung et al., 2023).

3 Aim and Objectives of study

3.1 Aim

- To study the effectiveness of multi-sensory intervention (MSI) on agitation among older adults with dementia

3.2 . Objectives

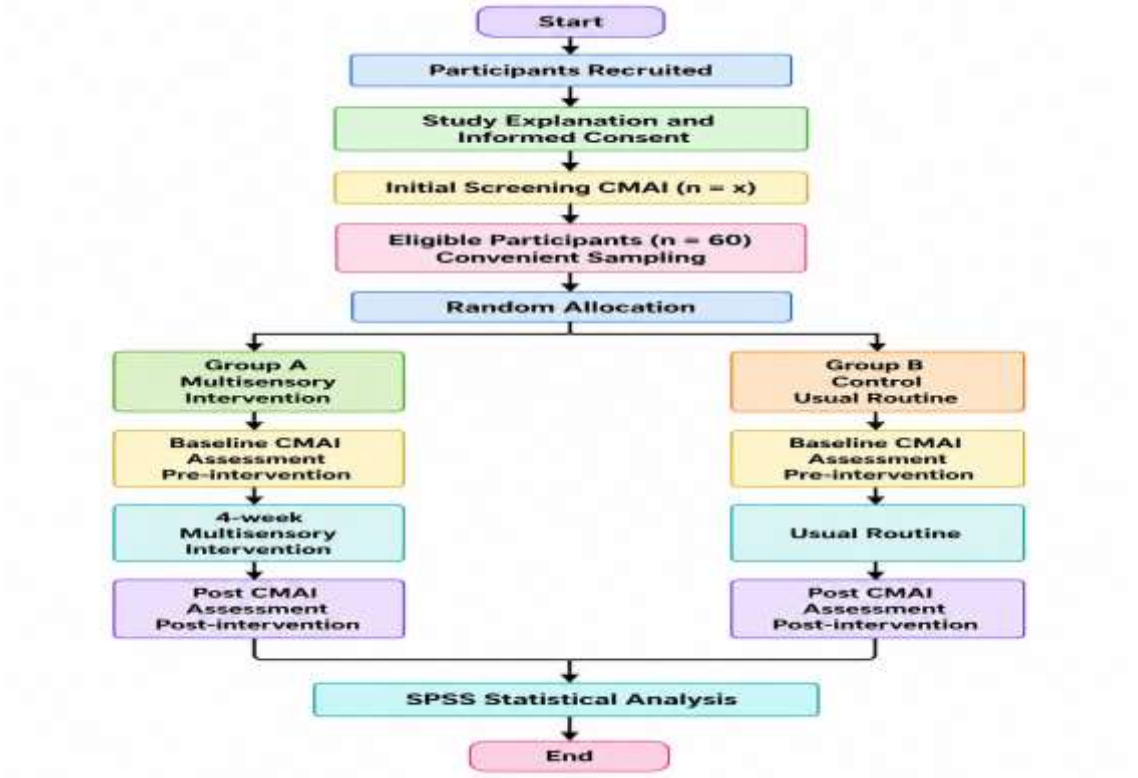
- To study demographical variables
- To determine pretest values of control group using Cohen-Mansifield Agitation Inventory (CMAI)
- To determine pretest values for the experimental group using Cohen-Mansifield Agitation Inventory (CMAI)
- To determine posttest values for the control group using Cohen-Mansifield Agitation Inventory (CMAI)
- To determine posttest values for the experimental group using Cohen-Mansifield Agitation Inventory (CMAI)
- To compare pretest and posttest of control group using Cohen-Mansifield Agitation Inventory (CMAI)
- To compare pretest and posttest of the experimental group using Cohen-Mansifield Agitation Inventory (CMAI)
- To compare control and experimental group

4. Methodology

A single-blinded randomized controlled trial was conducted among 60 older adults (≥60 years) with mild to moderate dementia and measurable agitation at Chettinad Hospital and Research Institute, Chennai. Ethical approval was obtained from the Institutional Human Ethics Committee and the study was prospectively registered with the Clinical Trials Registry–India. Participants were recruited through convenience sampling and randomly allocated into an experimental group (n = 30) and a control group (n = 30) using the sealed opaque envelope method. The experimental group received a multisensory intervention consisting of visual (nature scenes) and auditory (calming classical music) stimulation for 30 minutes per session, three times weekly for four weeks, while the control group continued with usual care. Agitation was assessed at baseline and after four weeks using the Cohen–Mansfield Agitation

Inventory (CMAI). Data were analyzed using SPSS version 32.0 to determine the effectiveness of the multisensory intervention on agitation among older adults with dementia

Figure 4.1. Flow Chart of the Study



5 Result and Analysis

Findings presented in this RCT provide effectiveness of Multisensory Intervention for decreasing agitation among elderly adults with Dementia

Demographic Characteristics

Table 5.1. Baseline Demographic Characteristics of Participants

Variable	Control group (n=30)	Experimental group (n=30)	t-value	p-value	χ^2-value
Age (years) Mean ± SD	69.87 ± 3.19	68.90 ± 3.73	-1.08	0.285	
Minimum-Maximum	64-76	63-75			
Male, n (%)	14 (46.7%)	13 (43.3%)			
Female, n (%)	16 (53.3%)	17 (56.7%)		1.000	0.00

No significant differences were observed between the groups in age or gender distribution at baseline ($p > 0.05$), indicating demographic comparability.

Within Group Analysis

Table 5.2 Within Group Comparison of CMAI scores

Group	Pre-test Mean ± SD	Post-test Mean ± SD	Mean Difference
Control Group (n=30)	93.60 ± 7.68	91.30 ± 7.97	2.30
Experimental Group (n=30)	94.33 ± 8.05	72.83 ± 8.37	21.50

Both groups showed significant reductions in CMAI scores following the intervention period. The reduction was substantially greater in the experimental group (21.50 points) than in the control group (2.30 points).

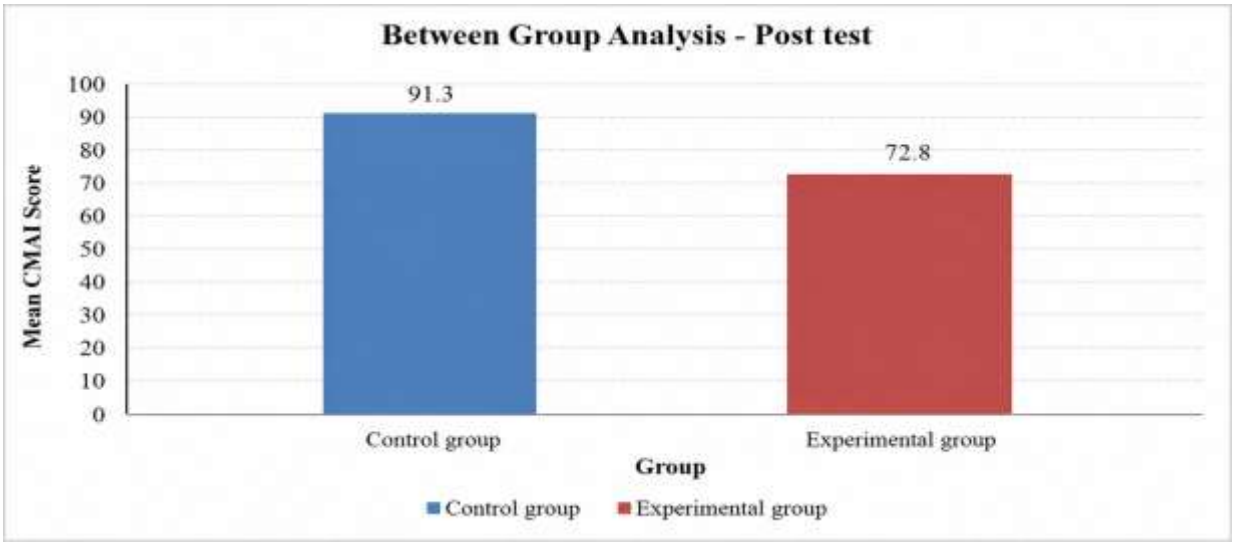
Within- and Between-Group Comparisons

Table 5.3 Statistical Comparison of CMAI Scores Between and Within Groups

Comparison	Statistical Test	Mean Diffference	t/z value	p-value
Control Group (Pre-test vs Post-test)	Wilcoxon Signed Ranks Test	2.30	-4.49	<0.001*
Experimental Group (Pre-test vs Post-test)	Wilcoxon Signed Ranks Test	21.50	-4.78	<0.001*
Between Groups (Post-test Scores)	Independent t-test	-18.47	-8.75	<0.001*

Both groups demonstrated significant reductions in CMAI scores following the study period ($p < 0.001$). The experimental group showed a substantially greater reduction in agitation than the control group, and post-test scores differed significantly between groups ($p < 0.001$)

Figure 4.2. Comparing Post-Test Scores Between Control And Experimental Groups



The experimental group showed a lower mean score (72.83) than the control group (91.30), indicating greater reduction in agitation following the multisensory integration intervention.

6 Discussion and Conclusion

The present randomized controlled trial demonstrated that multisensory integration was effective in reducing agitation among older adults with dementia. While both groups showed significant improvements over the study period ($p < 0.001$), the experimental group exhibited a markedly greater

reduction in CMAI scores, decreasing from 94.33 ± 8.05 at baseline to 72.83 ± 8.37 post-intervention (mean difference = 21.50), compared to a reduction from 93.60 ± 7.68 to 91.30 ± 7.97 in the control group (mean difference = 2.30). Furthermore, post-test CMAI scores were significantly lower in the experimental group than in the control group ($t = -8.75$, $p < 0.001$). These findings suggest that multisensory integration is a safe, non-pharmacological, and effective intervention for reducing agitation in older adults with dementia and support its incorporation into occupational therapy and dementia care programs.

7 Limitations and Future Recommendations

This study has several limitations. The relatively small sample size and single-center design may limit the generalizability of the findings. In addition, the intervention period was short, and no follow-up assessments were conducted; therefore, the long-term sustainability of treatment effects could not be determined. The study focused primarily on agitation as measured by the CMAI, while other important outcomes such as quality of life, cognitive function, emotional well-being, functional independence, and caregiver burden were not assessed. Future research should include larger multicenter samples, extended follow-up periods, and a broader range of outcome measures. Further studies are also warranted to evaluate the effectiveness of multisensory integration across different types and stages of dementia and to explore individualized sensory interventions in various clinical and community-based care settings.

8. Acknowledgement

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