

Modality therapy for Dementia Management: A Systematic Review

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Abstract — Old age has a higher risk for suffering from dementia. Although there is currently no cure for dementia, there are several modality therapies that can be applied to help deal with complaints that arise in dementia. This study aims to identify the effect of modality therapy on cognitive, physiological and psychological changes in dementia patients. A systematic review was conducted, we performed a systematic review on Science direct, PubMed, Ebsco, Web of Science, Cinahl, Research Gate database for relevant articles. Studies were included if the interventions with modality therapy were carried out in Dementia patients, both those treated at home and nursing homes.

A total of 17 articles were included and 3 main categories emerged: cognitive, physiological, and psychological. Some therapeutic studio modalities can improve cognitive and physiological. Of these three categories, the category of psychological change is most often found. Psychological changes in depression, delusions and hallucinations (psychosis), agitation, apathy, aggression, sleep disturbance and disinhibition (inappropriate social relations and sections).

The provision of modality therapy can help improve psychological problems of patients treated both at home and in nursing homes, and this modality therapy can be recommended in providing implementation and activities tailored to the patient's characteristics and controlling external factors to achieve therapeutic effectiveness.

Keywords: *modality therapy, dementia, elderly, cognitive, physiological*

I. INTRODUCTION

The number of dementia patients is increasing quite high all over the world. The number of people with dementia is rapidly increasing worldwide. According to the World Health Organization, the annual number of new cases of dementia is approaching 7.7 million, implying a new case every 4 seconds [1]. In Indonesia it is estimated as many as 1.2 million Indonesians are affected by dementia, within three seconds as many as one person is affected by dementia. The number of people with dementia is currently estimated to be almost 50 million people in the world and is predicted to increase to 131 million in 2050 [2]. The strategy taken to improve the quality of life of dementia patients in this case is by giving more attention. Dementia management is provided as a complement in managing dementia patients. Complaints that often arise in patients with dementia, depression, delusions, hallucinations, agitation, apathy, aggression, disturbed sleep patterns, disinhibidi, and a decrease in daily activities. Pharmacological treatment is often given to overcome these problems.

The treatment process in dementia usually cannot be completely cured. Treatment can slow the progression of cognitive, psychological and physical function. Management of dementia treatment is done to maintain the quality of life and slow the progression of cognitive decline in dementia sufferers. Dementia management is carried out with a non-pharmacological intervention approach that has been proven and can improve the quality of life of patients both cognitive, psychological, and physical. Effective and efficient interventions with meaningful results are needed. The effectiveness with a pharmacological approach is the best and the substantial potential is the side effects of the drug. Several non-pharmacological intervention studies that show effectiveness in treating behavioral and psychological symptoms without side effects [3].

To identify management of dementia for non-pharmacological interventions, a systematic review was conducted. The concept of dementia management is defined as an intervention or program or strategy that can be applied to dementia patients and effectively supported by objective and comprehensive research and evaluation.

II. METHOD

A. Design

The design of this study is a systematic review, synthesis of findings from a study comparing the use of modality therapy as a management dementia

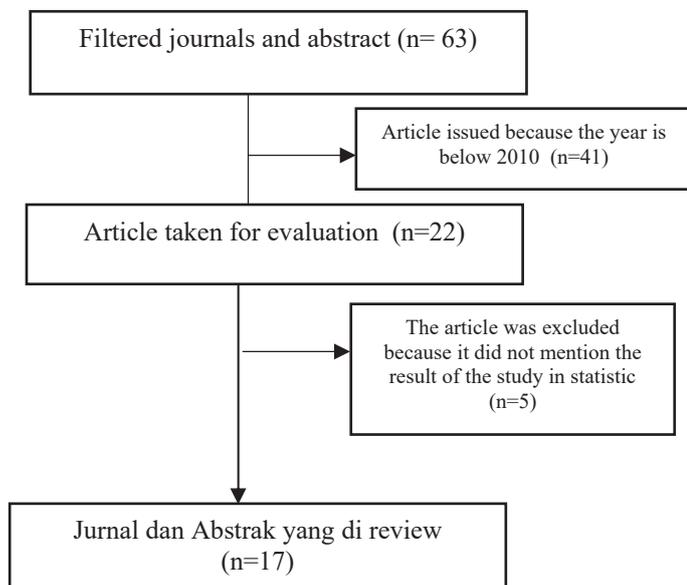
B. Literature Search

The author aims to identify all research related to modality therapy in managing dementia. A systematic search of the literature using Science Direct, PubMed, Ebsco, Web of Science, Cinahl, Research Gate database for relevant articles. The determination of the keywords is based on the PICOT framework (P: dementia, I: modality therapy, C: -, O: psychological, daily activity, physiological, cognitive, T: 2010-2019). Studies are included when describing interventions with modality therapy targeted at patients with dementia, focusing on cognitive, physiological and psychological changes in dementia patients.

C. Sample

Based on the search results obtained 63 articles and 17 articles that meet the inclusion criteria. Each selected study

uses modality therapy that is applied to dementia patients. Of the 17 journals reviewed 3 articles focused on cognitive change, 14 journals focused on physical change, and 12 journals focused on psychological change.



III. RESULT

A. Cognitive outcome

Of the 17 articles only 3 articles describe modality therapy in dementia that focuses on the cognitive of patients. Dementia is characterized by impaired cognitive function and continues to decline, cognitive function involves memory disorders, behavioral disorders and personality changes. In the Chia-Jung study, et al. Showed results after 12 sessions, patients in the control group found a decrease in depressive mood ($p < 0.05$), an increase in behavior scores ($p < 0.05$), cognitive improvement ($p < 0.05$). Neuropsychiatric inventory depression scores also decreased ($p < 0.05$) [4]. In the study of Karssemeijer et al showed a small to medium positive effect of combined cognitive-physical interventions on global cognitive function in older adults with dementia ($p < 0.00$). The analysis showed moderate to large positive effects after a combination of cognitive-physical interventions for activities of daily life ($p < 0.01$) and small to moderate positive effects for mood ($p < 0.01$). This functional benefit emphasizes the clinical relevance of a combination of cognitive and physical training strategies [5]. Whereas in the study of Jin Lee et al, the experimental group showed an increase in cognitive, degree of dementia, depression, and daily living activities compared to the control group [6].

Dementia is a disorder that occurs in cognitive function and memory that causes dysfunction in daily life. Therapy that has been given during pharmacological therapy. Recent research that shows pharmacology is ineffective and can cause damage to body organs. Several modality therapy studies in dementia have been shown to improve cognitive function in a consistent and continuous manner.

B. Physiological outcome

Seifert's research showed that in the treatment group with sculpting activity there was an increase in mental state and concentration, independence, increased self-esteem and physicality [7]. In the Takeda study, in the treatment group given inhaled aromatherapy, the total sleep time was significantly longer in the intervention period than in the control period ($p < 0.05$) [8]. Whereas in the Man-Hua Yang study, after being given aromas-acupressure and aromatherapy, sympathetic nerve activity was given a little more significantly for four weeks in the acupressure scent group and in the second week in the aromatherapy group, where parasympathetic nerve activity increased in the second to fourth week in the aroma group -resistance and fourth week in the aromatherapy group [9]. Whereas in the Bieke Van Deun study, to improve muscle tone, patients were given a position with a support pillow, lower position of the biceps brachii muscle ($p < 0.041$) and higher elbow extension ($p < 0.006$) can increase brachii biceps muscle strength compared with no support pillow [10]. In managing pain in dementia patients, according to Kapoor's study, the intervention group had a greater change ($1,200 \pm 1.78$) when compared to the control group (0.800 ± 2.16) [11]. In Balzotti et al's study, the dummy therapy group showed a significant increase in agitation, irritability, apathy, depression and relative control of delusions. The gesture-verbal treatment group showed a significant increase in apathy and depression [12]. Whereas in the Kazuyo study, the treatment group was given aromatherapy, the quantitative data showed a significant increase in BPSD or daily activities. On qualitative data, the data is classified into four categories namely emotion, behavior, verbal communication and non-verbal communication [13]. Physical disorders in dementia such as disturbed sleep patterns, disruption of daily activities, the presence of muscle weakness, the presence of pain. Treatment that is often given is antidepressants, antipsychotics, anxiolytics, and hypnotics. Pharmacological treatment there are clinical effects and side effects as well. Patients with dementia occur physiologically and are susceptible to side effects. In recent years, non-pharmacological and psychosocial interventions have increasingly become a concern in the management of BPSD. This intervention has been recommended in general dementia guidelines, without agreement on specific practices, as first-line treatment in combination with the use of pharmacological therapy for BPSD. However, psychosocial interventions that are included in non-pharmacological interventions have also been recommended for the treatment of people with dementia. Not only to improve cognitive, improve cognitive abilities, improve emotional well-being, reduce behavioral symptoms and carry out daily activities [12].

C. Psychological outcomes

There are 12 articles that mention modality therapy in dementia which focuses on physical aspects. Johannessen's research shows that from 24 nursing homes and 12 nurses from 4 nurse participants in this study, the use of lavender essential oil can reduce insomnia and anxiety. In the study of Hanne Mette et al, impaired agitation increased during standard treatment and decreased during music therapy ($p < 0.027$) and prescription psychotropic drugs increased

significantly more frequently during standard treatment than during music therapy ($p < 0.02$) [13]. Another modality therapy carried out by Man-Li Liao, showed that after patients were invited to visit the park, the patient's mood was improved, followed by reducing depression, reducing agitation and increasing social interaction [14]. In the study of Raglio et al. After being given music therapy, the Neuropsychiatric Inventory score decreased significantly in the treatment group ($p < 0.002$) at weeks 8, 16 and 20. Specific psychological and behavioral symptoms of dementia were delusions, agitation, anxiety, apathy, irritability, and disturbance of sleep patterns [15]. There are 12 articles that mention modality therapy in dementia which focuses on physical aspects. Johannessen's research shows that from 24 nursing homes and 12 nurses from 4 nurse participants in this study, the use of lavender essential oil can reduce insomnia and anxiety. In the study of Hanne Mette et al, impaired agitation increased during standard treatment and decreased during music therapy ($p < 0.027$) and prescription psychotropic drugs increased significantly more frequently during standard treatment than during. and modality therapy to improve the quality of life can be done drama therapy, after doing drama therapy an increase in quality of life and ADL by 1 point while in the film group decreased 1.8 points [16].

IV. CONCLUSION

The provision of modality therapy can help improve psychological problems of patients treated both at home and in nursing homes, and this modality therapy can be recommended in providing implementation and activities tailored to the patient's characteristics and controlling external factors to achieve therapeutic effectiveness.

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Author, year	Study design	Sample	Outcome			Results
			Cognitive	Physiological	Psychological	
Ai Takeda, Emiko Watanuki, and Sachiyo Koyama (2017)	Experimental design	elderly aged ≥ 65 years, experiencing sleep disorders.		Sleep disturbance		<ol style="list-style-type: none"> 1. There is a significant difference in the total sleep time of the elderly ($p = 0.005$). 2. There is a significant difference in the number of first awakened ($p = 0.010$). 3. There is a significant difference in BPSD ($p = 0.032$).
Man-Hua Yang, Li-Chan Lin, Shiao-Chi Wu, Jen-Hwey Chiu, Pei-Ning Wang and Jaung-Geng Li	Experimental design	dementia in accordance with DMS-IV criteria, has a score of ≥ 35 (severe agitation) after being measured by the Cohen Mansfield Agitation Inventory (CMAI), can attend research sessions Monday to Friday, there are no infections or injuries in the acu-point area.		Measuring sympathetic and parasympathetic nerve activity	Agitation	<ol style="list-style-type: none"> 1. There is a significant difference in CMAI scores in the aroma-acupressure and aromatherapy groups compared to the control group. 2. There is a significant difference in CMAI scores in the aroma-acupressure group before and after the intervention. 3. There is a significant difference in CMAI scores in the aromatherapy group before and after the intervention. 4. The difference in CMAI scores is greater in the aroma-acupressure group than in the aromatherapy group. 5. There are differences every week on the LF / HF score in the aroma-acupressure group compared to the control group. 6. HF scores in the aroma-acupressure group increased significantly in the second, third, and fourth weeks of the study. 7. The HF score in the aroma-acupressure group increased significantly in the fourth week of the study.
Kim Cho Heeyoun (2018)	RCT	elderly with dementia, aged 65-100 years, do not have severe hearing loss, and can sit in a chair or wheelchair for 1 hour.			Quality of life Mood, both positive and negative	Singing groups can improve the quality of life of the elderly and positive moods in the elderly with dementia.
Hanne Mette O. Ridder, Brynjulf Stige, Liv Gunnhild Qvale, and Christian Gold (2013)	RCT	patients in nursing homes diagnosed with dementia in elderly care homes, 10 nursing homes in Norway, and 4 nursing homes in Denmark.			Agitation Quality of life	There was a significant difference in the agitation of the elderly in dementia before and after music therapy ($p = 0.027$).
Juh Hyun Shin (2015)	Experimental design	Dementia patients with mild or severe cognitive impairment and stay for 3 months in a nursing home			Quality of life	<ol style="list-style-type: none"> 1. There is a significant difference in aggressive, obsessive behavior, uttering harsh words, and daydreaming ($p < 0.01$).
Jin Lee, Byounghee Lee, Yuhung Park, Yumi Kim (2015)	Experimental Design	Patients with dementia Clinical Dementia Rating 0.5-5, there is no regular therapy for dementia, and can understand simple instructions.	Kognitive	ADL	Depression	<ol style="list-style-type: none"> 2. There is a significant difference in positive moods, for example calm ($p < 0.01$).
Man-Li Liao, Sheng-Jung Ou, Chung Heng Hsieh, Fu Jen, Zhelin Li, Chia-Chun Ko. (2018)	A pilot study	Elderly with dementia treated in 9 care homes	Kognitifve	ADL	Mood, agitation	There are significant differences in mood enhancement, decreased levels of depression, increased social interactions, and decreased levels of agitation.

Author, year	Study design	Sample	Outcome			Results
			Cognitive	Physiological	Psychological	
Bieke Van Deun PhD a, Nele Van Den Noortgate PhD, Anke Van Bladel PhD, Koen De Weerdts MsC, Dirk Cambier PhD (2019)	Interventional clinical trial	22 Dementia patients who experience moderate to severe paratonia.		Muscle tone, range of motion, pain and daily care		After 30 minutes positioned with SC, participants had lower brachii biceps muscle tone ($P < .041$) and a higher maximum elbow extension ($P < .006$) than without SC. After a 30 minute session HT, a significant increase in biceps brachii muscle tone ($P = 0.032$) and maximal elbow extension ($P < .001$) and knee ($P < .028$) were found. Pain ($P = 0.003$) and discomfort ($P = 0.001$ to $P = 0.019$) during the morning treatment were significantly lower when the treatment was preceded by 30 minutes of HT.
Yamini Kapoor and Robin Orr (2015)	RCT	10 patients with dementia were divided into 2 groups (5 interventions and 5 controls)		Pain		Greater pain reduction was found in the treatment group (1.2 points). compared to the control group (0.8 point)
Angela Balzotti, Marianna Filigrasso, Claudia Altamura I, Beth Fairfield, Antonello Bellomo, Fabio Daddato, Rosa Anna Vacca, Mario Altamura (2018)	Experimental design	30 patients were divided into 3 groups (group 1 received gesture-verbal treatment) (GVT), group 2 received doll therapy, and group 3 controls			Agitation, irritability, apathy, depression and delusions	The DT (Doll Therapy) group showed significant improvements in agitation, irritability, apathy, depression, and delusions compared to the control group. The GVT group showed significant improvements in apathy and depression with respect to controls. DT Interventions improve the symptoms of agitation compared to GVT interventions whereas GVT interventions show improvement in apathy compared to DT interventions.
Alfredo Raglio, PhD, et al (2015)	RCT	120 people with dementia with weight to weight were divided into 3 groups (group 1 was given active music therapy / MT and group 2 was given listening therapy music/LtM, dan kelompok 3 kontrol)		ADL	Mood, behavior, verbal communication and non verbal communication	Quantitative data indicate that there is no therapy that significantly increases ADL results. Qualitative data are classified into four main categories: mood, behavior, verbal communication, and Nonverbal communication shows participants' positive experiences during therapy.
Chia-Jung Hsieh, Chueh Chang, Shu-Fang Su, Yu-Ling Hsiao, Ya-Wen Shih, Wen-Hui Han, Chia-Chin Lin, (2010)	Experimental design	66 partisipan with demensia	Kognitive		Depression	After 12 sessions, the residents in the intervention group reported a reduction in depressed mood ($Z = -2.99$, $p < 0.05$), and showed specific improvements in their behavior score ($Z = -3.10$, $p < 0.05$) and cognition apathy score ($Z = -1.95$, $p < 0.05$). Neuropsychiatric Inventory depression scores had also decreased ($Z = -2.20$, $p < 0.05$).
Johannessen, Berit (2013)	An action research project	12 nurses and 24 patients		Sleep disturbance	Anxiety	24 resident and twelve nurses from four nursing homes participated in an action research study. The use lavender diffused nightly was perceived as an effective care modality reducing insomnia and anxiety.
E.G.A. Esther Karssemeijer, J.A. Justine Aaronson, W.J. Willem Bossers, T. Tara Smits, M.G.M. Marcel Olde Rikkert, R.P.C. Roy Kessels (2017)	A meta-analysis	10 RCT	Kognitive	physical training		The primary analysis showed a small-to-medium positive effect of combined cognitive-physical interventions on global cognitive function in older adults with MCI or dementia (SMD[95% confidence interval]= 0.32[0.17;0.47], $p < 0.00$). A combined intervention was equally beneficial in patients with dementia (SMD = 0.36[0.12;0.60], $p < 0.00$) and MCI (SMD = 0.39[0.15;0.63], $p < 0.05$). In addition, the analysis showed a moderate-to-large positive effect after combined

Author, year	Study design	Sample	Outcome			Results
			Cognitive	Physiological	Psychological	
						cognitive-physical interventions for activities of daily living (ADL) (SMD = 0.75[0.42;1.08], p<0.01) and a small-to-medium positive effect for mood (SMD = 0.27[0.48;0.96], p<0.01). These functional benefits emphasize the clinical relevance of combined cognitive and physical training strategies.
Joanna Jaaniste, Sheri and Linnell, Richard L. Ollerton, Shameran Slewa-Younan	Mixed methods (kuantitatif and kualitatif)	13 patients with dementia			Quality of life	Quantitative: In the drama group there was an improvement in quality of life and ADL by 1.0 point, while in the film group there was a 1.8 point decrease. Kualitatif: Established an unambiguous participant ability to express ideas and feelings through drama therapy as well as an unveiling of conscious awareness of participants own wellbeing and quality of life
Kathrin sseifert, Annika spottke, Klaus fliessbach	Experimental design	12 partisipant		Physical independence	Emotional well-being	Remarkable improvements were seen in several subscales in the sculptural activity group, but not the control group: Mental state and concentration (nine of thirteen key aspects), self-reliance (four of five), self-esteem (one of one) and physicality (two of two). The results of this pilot study indicate the multidimensional effects of sculptural activity on patients living with dementia.