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Effect of Music Therapy on the Rehabilitation of Elderly People with Dementia

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Abstract. Objective: Evaluating the Effectiveness of Music Therapy on the Rehabilitation of Elderly People with Dementia. Methods: Twenty-four Elderly People with Dementia were selected and randomly divided into the Experimental and the Control Groups, with twelve people in each group. In the Control Group, Elderly People with Dementia were given regular care and treatment; In the Experimental Group, they were given extra twenty sessions of group music therapy. In the Experimental Part, The Mini-Mental State Examination(MMSE) and the Cornell Scale for Depression in Dementia(CSDD) were used to score and compare the twenty-four elderly People to verify their validity. Results: After treatment, the experimental group showed better MMSE and CSDD scores than the control group ($P<0.05$). Conclusion: The result showed that music therapy combined with regular care and treatment could improve the cognitive function and emotional states of elderly people with dementia, alleviating their autistic symptoms and promoting rehabilitation

Keywords. Music Therapy, Dementia, Rehabilitation

1. Introduction

Dementia is a global societal challenge, affecting over 55 million people worldwide. As the population ages, the number of individuals living with dementia is expected to rise significantly. Currently, no pharmacological treatment is available to stop the progression of dementia, despite ongoing advancements in clinical trials.

However, there is growing interest and research in non-pharmacological interventions, such as music therapy, to improve the well-being and quality of life of individuals with dementia[1]. Music therapy utilizes the power of music to stimulate various cognitive processes, evoke emotions, and elicit memories. It is a person-centered approach that recognizes the individual's preferences, experiences, and cultural background.

Studies have shown that music therapy can positively impact individuals with dementia. It has been found to reduce agitation and anxiety, improve mood, enhance communication, and facilitate social interaction[2]. Music therapy sessions often involve listening to familiar music, singing, playing musical instruments, and engaging in rhythmic activities. The therapeutic benefits of music therapy in dementia care extend

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beyond mere enjoyment. Music uniquely activates multiple areas of the brain, even in individuals with advanced dementia[3]. It can tap into preserved neural pathways, allowing for emotional and cognitive connections that may otherwise be inaccessible.

As the field of music therapy continues to evolve, ongoing research is being conducted to understand its mechanisms of action better and to refine therapeutic approaches. By incorporating music therapy into comprehensive dementia care plans, healthcare professionals, caregivers, and families can provide meaningful interventions and support for individuals with dementia[4].

Inspired by this, the purpose of this study is to investigate the effect of music therapy on the rehabilitation of elderly people with dementia (see Figure 1).

Figure 1. An illustration showing elderly people with dementia receiving music therapy.

2. Related Work

2.1. Music Therapy and Cognitive Function

There have been many studies showing that music can effectively stimulate and enhance the memory of elderly patients with dementia[5, 6]. Therefore, music therapy is often used to awaken the memory and emotions of dementia patients, stimulating both long-term and short-term memory. When elderly dementia patients listen to music that has left a deep impression on their lives, it can strongly evoke their memories of past life experiences. Through storytelling and discussions about their past experiences, their thinking abilities, language expression, and cognitive abilities can be improved in all aspects[7]. Furthermore, music can also stimulate the thinking abilities and problem-solving skills of elderly dementia patients. Studies have shown that music can inspire creative thinking and inspiration in the brain[8]. When elderly dementia patients engage in music activities, they can exercise and improve their thinking abilities by collaborating,

thinking, and solving problems with music[9]. This is crucial for enhancing the cognitive abilities and quality of life of elderly dementia patients.

2.2. Music Therapy and Emotional States

Depression, agitation, and wandering are common behaviors associated with dementia and frequently observed among nursing home residents. Even with pharmacological treatment, behaviors often persist, hindering the quality of life for elders, their families, and caregivers.

People with dementia need to be provided with a creative outlet for expression, especially during times of distress, dysfunction, and deflated mood that often occur due to the diagnosis. For people with dementia, music therapy leads to positive self-esteem, increases competence and independence, and diminishes feelings of social isolation[10]. Ashida used music therapy techniques such as reminiscence with familiar songs for people diagnosed with dementia who had symptoms of depression and found, in a pre-post test analysis, that after five sessions of small group music therapy, symptoms of depression were significantly reduced[11].

3. Method

3.1. Participants

This study selected Twenty-four elderly dementia patients who resided in a charitable nursing home in Hangzhou, China, from October 2021 to June 2023. Those elderly dementia patients were randomly allocated to an experimental or a control group, giving 12 in each condition (see Table 1).

They met the classification and diagnosis criteria for mental disorders in China, supported by head CT or MRI scans, and had been receiving stable doses of medication for at least three months. The initial score on the Mini-Mental State Examination (MMSE) was ≥10, and the initial score on the Cornell Scale for Depression in Dementia (CSDD) was ≥6. No statistically significant difference in general information between the control and experimental groups ($P>0.05$) made them comparable. All participating members signed an informed consent form, and this study was conducted with the consent of the relevant person in charge of the nursing home and the elderly patients' families.

Table 1. Comparison of general data between two groups ($\bar{x} \pm s$)

Group		Experimental group	Control group
Number (n)		12	12
Gender (n)	Male	6	6
	Female	6	6
Average age (years)	Male	68.78±3.4	70.13±4.1
	Female	70.12±2.8	69.24±3.6
Level of education (n)	Under junior high school education	3	2

Above junior high school education	9	10
The average length of stay in the nursing home (months)	23.4±4.3	21.8±3.9

4. Study design

4.1. Control group

The control group adopted conventional nursing and treatment methods to provide comprehensive care and support.

First, understanding the patient's medical history is crucial in assessing and developing personalized nursing plans. By understanding the patient's medical history, symptoms, and disease progression, nursing staff can better understand the patient's needs and priorities. Personal care is another important aspect, including supporting diet, personal hygiene, daily activities, and social interaction. Proper dietary arrangements and food choices help maintain the patient's nutritional status and provide the necessary energy and nutrients.

In addition, safety care is also essential. Due to cognitive impairments in elderly dementia patients, they may face risks such as falls, accidental injuries, and getting lost. Therefore, nursing staff must take appropriate safety measures, such as providing a safe living environment, appropriate assistive devices, supervising walking activities, and conducting regular safety assessments and inspections. Conventional medication treatment is essential in managing symptoms and behavioral problems in elderly dementia patients. Using drugs that improve a patient's cognitive function or anti-psychotic drugs is a common treatment strategy. These medications can help alleviate the patient's cognitive decline and improve attention and memory.

4.2. Experimental group

The experimental group received 20 additional music therapy sessions with the assistance of a music therapist in addition to routine nursing and treatment, which were the same as those obtained by the control group. Each session took place once a week and lasted for 40 minutes.

Each therapy session was divided into seven sessions: Session 1: Prior to each music therapy session, the music therapist evaluated the results of the previous session's music activities and observed the physical and mental condition of the patients in order to determine an appropriate treatment plan ; Session 2: Instruments such as triangles, clappers, maracas, handbells, and tambourines were used to engage the patients in music-playing activities, stimulating their music perception and motor skills ; Session 3: Therapeutic singing activities were conducted, where familiar songs were selected for the patients to sing along to, utilizing fill-in-the-blank lyrics to facilitate memory recall and participation ; Session 4: Music appreciation was encouraged by exposing the patients to different types of music, enhancing their emotional experience and aesthetic sense[12] ; Session 5: Color sound bell, hand function, and attention rehabilitation activities were conducted, with the music therapist encouraging patients to vocalize a

color out loud and then press the corresponding colored bell, promoting cognitive and hand-eye coordination abilities ; Session 6: Traditional festival music was incorporated, encouraging patients to accompany the music briefly with an instrument to showcase their sense of celebration and engagement[13] ; Session 7: Each participant was given the opportunity to choose an instrument that represented themselves and take turns initiating a group improvisation, fostering individual expression and collaboration[1].

5. Measurement

5.1. Cognitive Function

We measured the effect of music therapy on cognitive function in elderly patients with dementia using the Mini-Mental State Examination (MMSE) for scoring.

The Mini-Mental State Examination (MMSE) is a widely used screening tool to assess cognitive function in individuals[14]. It consists of questions and tasks that measure various cognitive domains such as orientation, memory, attention, language, and visual-spatial abilities. The total score on the MMSE ranges from 0 to 30, with lower scores indicating poorer cognitive function[15]. The MMSE is commonly used in clinical settings to aid in diagnosing cognitive impairment and dementia.

5.2. Emotional States

We measured the effect of music therapy on Emotional States in elderly patients with dementia using the Cornell Scale for Depression in Dementia(CSDD) for scoring.

The Cornell Scale for Depression in Dementia (CSDD) is a widely used assessment tool to evaluate emotional states in individuals with dementia[16]. It consists of 19 items that assess various depressive symptoms, including mood, behavior, physical signs, and self-esteem. Each item is rated on a scale from 0 to 2(0 = None, 1 = Mild or Intermittent, 2 = Severe), with higher scores indicating more severe depressive symptoms[17]. The CSDD is commonly used in research and clinical settings to aid in diagnosing and monitoring depression in individuals with dementia[18].

5.3. Data Processing

Data were analyzed, and information was measured using SPSS 22.0. t-test for paired samples was used for intra-group comparisons. n(%) was used for numerical calculations, and $P<0.05$ for comparison between groups.

6. Results

6.1. Comparison of the scores of the Mini-Mental State Examination (MMSE) before and after the treatment between the two groups of Elderly People with Dementia

According to the provided data, the MMSE scores of the experimental group showed changes before and after treatment at different time points. Before treatment, the MMSE scores of the experimental group were similar to those of the control group. However, at

ten weeks and twenty weeks after treatment, the MMSE scores of the experimental group significantly improved, indicating a positive impact of the treatment on cognitive function. The treatment effect of the experimental group was notably better than that of the control group (see Figure 2).

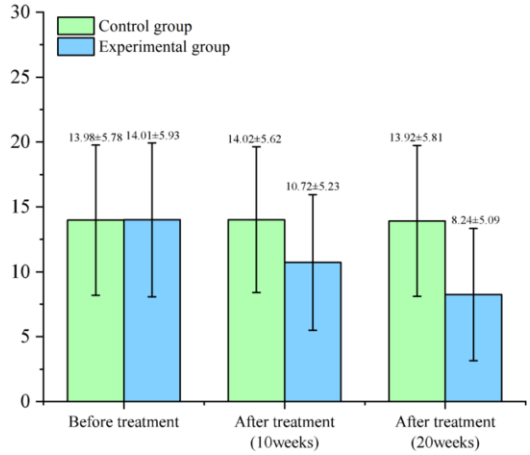

Figure 2. Comparison of the scores of the Mini-Mental State Examination before and after the treatment between the two groups.

6.2. Comparison of the scores of the Cornell Scale for Depression in Dementia(CSDD) before and after the treatment between the two groups of Elderly People with Dementia

According to the provided data, the CSDD scores of the experimental group showed changes before and after treatment at different time points. Before treatment, the CSDD scores of the experimental group were slightly lower than those of the control group. However, at ten weeks and twenty weeks after treatment, the CSDD scores of the experimental group significantly decreased, indicating a positive effect on the relief of depressive symptoms. The treatment effect of the experimental group was notably better than that of the control group (see Figure 3).

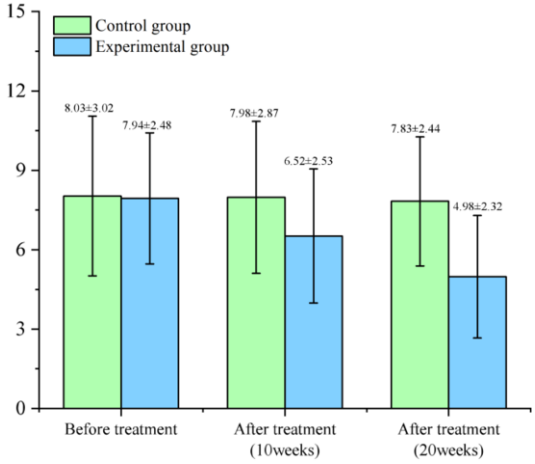

Figure 3. Comparison of the scores of the Cornell Scale for Depression in Dementia before and after the treatment between the two groups.

7. Discussion and Conclusion

This study assessed the effectiveness of music therapy in rehabilitating elderly people with dementia. The experimental group, who received twenty sessions of group music therapy in addition to regular care and treatment, showed significant improvements in MMSE and CSDD scores compared to the control group. These findings align with previous research highlighting the positive effects of music therapy on cognitive function and emotional well-being in individuals with dementia. These findings emphasise the potential of music therapy as a non-pharmacological approach to promote rehabilitation in individuals with dementia. Further research is needed to explore this population's long-term effects and optimal duration of music therapy interventions.

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