ORIGINAL RESEARCH

Effects of Traditional Chinese Medicine Five-Element Music Therapy Combined with Mirtazapine on Depression and Limb Function Recovery After Ischemic Stroke

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ABSTRACT

Objective • To observe the effects of traditional Chinese medicine (TCM) five-element music therapy combined with mirtazapine on depression and limb function recovery after ischemic stroke.

Methods • A total of 110 patients treated in the Departments of Geriatrics, Cardiology, and Psychology of three hospitals in Qinhuangdao City, Hebei Province, China from October 2022 to August 2023 were selected. Based on the scores of 24-item Hamilton Depression Scale (HAMD-24), Barthel (BL) index, and National Institute of Health Stroke Scale (NIHSS) before enrollment, the patients were randomly divided into control group (n = 58) and experimental group (n = 52). The patients in control group were treated with limb rehabilitation, while those in experimental group underwent limb rehabilitation combined with five-element music therapy and mirtazapine.

Results • After 12 weeks of treatment and observation, 11 patients in control group and 9 patients in experimental group withdrew from this trail. As for the proportions of score changes, experimental group had higher decline proportions of HAMD-24 score and NIHSS score as well as an increased proportion of BL index score than control group, which were 43.97%, 69.32%, and 44.12%, respectively.

Conclusion • TCM five-element music therapy combined with mirtazapine significantly improves depression and limb function recovery after ischemic stroke. (*Altern Ther Health Med.* [E-pub ahead of print.])

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INTRODUCTION

Ischemic stroke, also known as cerebral infarction, is induced by transient or permanent occlusion of cerebral blood vessels, accounting for a large proportion in stroke cases.[1] As the underlying pathologic cause of ischemic stroke, intravascular thrombosis may lead to disability and increase the mortality rate if not managed or treated early.[2] Ischemic stroke is a highly prevalent and fatal cardiovascular disease, which is often accompanied by varying degrees of sequelae in middle-aged and elderly patients after onset. Post-stroke depression (PSD) is one of the most common neuropsychiatric consequences of stroke,[3] which exerts adverse effects on the daily work, profoundly affecting individuals' quality of life.[4]

PSD and limb dysfunction greatly affect the survival of patients, and lifestyle factors are implicated in the pathogenesis of depression.[5] Depression is defined as a disease involving a range of emotions or emotional disorders, mainly characterized by depressive symptoms of various causes.[6] The Five Elements Theory of Traditional Chinese Medicine believes that all things in the universe are composed of five elements: wood, fire, earth, gold, and water, and the human body is also composed of these five elements. The five elements constrain and transform each other to maintain

normal physiological and psychological functions of the human body. By adjusting the balance between the five elements, the effect of treating diseases and maintaining health can be achieved. Music therapy stimulates the nervous, endocrine, and immune systems of the human body through elements such as rhythm, melody, and harmony, achieving a soothing and promoting effect on the body and mind. Multiple studies have shown that music therapy can improve mental health problems such as depression and anxiety, as well as physiological health problems such as sleep and pain. Currently, the music library of *Traditional Chinese Medicine Five-Element Music Therapy (Authentic Mode)*, arranged by Shi Feng and issued by Chinese Medical Multimedia Press, with Hao Wanshan as the consultant, boasts the most widespread application in five-element music therapy for depressed patients. It contains 5 tones, namely jue tone, zhi tone, gong tone, shang tone, and yu tone, and each tone is arranged with 2 songs, which make the song more rhyming and helps to calm the listener's mood and aid in treatment.

During treatment, the patients in experimental group were arranged to listen to the above music for 1 h twice a day after limb rehabilitation exercise. Mirtazapine, an atypical antidepressant, is mainly used to treat major depressive disorder,[7] and it is a kind of peripheral arterial vasodilator capable of reducing peripheral vascular resistance. In particular, it can decrease the blood pressure in elderly patients. Moreover, the patients in experimental group took the drug once a day at 30 min after meals according to medical orders. In this clinical trial, the TCM five-element music therapy was combined with mirtazapine to treat depression and promote limb function recovery after ischemic stroke, so as to improve and enhance patients' quality of life.[8-13] There are extremely complex interactions between depression and stroke,[14] causing distress to both patients and their caregivers.[15]

As a branch of modern science, the TCM five-element music therapy with five elements, five viscera, five notes, five minds, and five sounds in TCM theory as the theoretical basis of music therapy can alleviate the psychological problems of the patients, enhance their yearning for life, and improve their prognosis and compliance with treatment through instructing them to listen to relevant music and combining with traditional clinical drug therapies.[16]

DATA AND METHODS

General data

A total of 110 patients treated in the Departments of Geriatrics, Cardiology, and Psychology of three hospitals in Qinhuangdao City, Hebei Province, China from October 2022 to August 2023 were selected and randomly divided into control group (n = 58) and experimental group (n = 52). Both groups of patients were tested by 24-item Hamilton Depression Scale (HAMD-24), Barthel (BL) index, and National Institute of Health Stroke Scale (NIHSS) before treatment, and the scores were recorded.

Inclusion criteria

All patients are hospitalized observation patients. (1) Patients who were diagnosed with or had a history of ischemic stroke, with an age of 55-65 years old, (2) those with states of anxiety and depression, (3) those with a course of disease of 0.5-2 years, (4) those with HAMD-24 score ≥24 points, (5) those with BL index ≤60, and (6) those with NIHSS score of 20-42 points (Table 1). And moreover, all operations comply with the requirements of the Ethics Committee of Qinhuangdao Jiulongshan Hospital and Peking University Third Hospital Qinhuangdao Hospital.

Methods

The patients in control group were treated with physical rehabilitation alone, and those in experimental group received the TCM five-element music therapy combined with mirtazapine in addition to physical rehabilitation for 12 weeks.

Observation indexes

At weeks 4, 8, and 12 of treatment, HAMD-24 score, BL index score, and NIHSS score were re-examined for patients in control and experimental groups, and their changes and change amplitudes were recorded.

Statistical methods

SPSS 20.0 and GraphPad Prism 9.0 software was employed to analyze the data and drawing. Measurement data were expressed as ($\bar{x} \pm s$) and subjected to t-test for intergroup comparison. Enumeration data were presented as [n (%)], and examined by χ^2 test for intergroup comparison. $P < .05$ indicated that the difference was statistically significant.

RESULTS

During treatment, 11 patients in control group and 9 patients in experimental group withdrew from this trail. Then the patients were tested by scales again at weeks 4, 8, and 12, and the scores were recorded. These results were shown in Table 1 and Figure 1.

Comparison of HAMD-24 scores

There was no significant difference in HAMD-24 score between the two groups of patients before treatment ($P > .05$), but there was a statistically significant difference after 8 weeks of treatment ($P < .05$). After treatment, the decrease amplitude of HAMD-24 score in control group and experimental group was 32.53% and 43.97%, respectively (Table 2 and Figure 2).

Comparison of BL index score

The difference in BL index score between the two groups of patients was not significant before treatment ($P > .05$) but statistically significant after 8 weeks of treatment ($P < .05$). The scores were raised by 32.58% in control group and 44.12% in experimental group after treatment (Table 3 and Figure 3).

Table 1. General ($\bar{x} \pm s$)

Group	Age (years)	Gender		Course of Disease (Year)
		male	female	
Control group (n = 43)	60.23±3.11	25	18	1.22±0.26
Experimental group (n = 47)	60.47±3.86	26	21	1.16±0.33
t/χ^2	0.3229	0.0727		0.9520
P value	.7475	.7874		.3437

Table 2. Comparison of HAMD-24 scores between two groups of patients ($\bar{x} \pm s$)

Group	Before	Treatment for 4 weeks	Treatment for 8 weeks	Treatment for 12 weeks
Control group (n = 43)	29.74±2.33	27.53±1.94	23.09±1.73	20.05±0.84
Experimental group (n = 47)	29.17±2.22	26.83±1.66	19.26±0.99	16.30±0.59
t	1.1882	1.8438	13.0279	24.6731
P value	.2379	.0686	<.05	<.05

Note: Data displayed as ($\bar{x} \pm s$), compared to before treatment

Table 3. Comparison of BI indices between two groups of patients ($\bar{x} \pm s$)

Group	Before	Treatment for 4 weeks	Treatment for 8 weeks	Treatment for 12 weeks
Control group (n = 43)	50.60±2.54	52.24±2.47	54.56±1.78[a]	56.41±0.95[a]
Experimental group (n = 47)	50.77±2.77	53.21±2.22	58.82±1.49[a]	62.49±0.67[a]
t	0.3025	1.9621	12.6379	35.3205
P value	.7630	.0529	<.05	<.05

[a]*P* < .05

Note: Data displayed as ($\bar{x} \pm s$), compared to before treatment

Table 4. Comparison of NIHSS scores between two groups of patients ($\bar{x} \pm s$)

Group	Before	Treatment for 4 weeks	Treatment for 8 weeks	Treatment for 12 weeks
Control group (n = 43)	27.15±1.78	19.68±2.51	16.39±2.15[a]	12.31±1.66[a]
Experimental group (n = 47)	26.89±1.77	18.84±2.29	12.43±1.72[a]	8.25±0.27[a]
t	0.6942	1.6603	9.6870	16.5384
P value	.4894	.1004	<.05	<.05

[a]*P* < .05

Note: Data displayed as ($\bar{x} \pm s$), compared to before treatment

Comparison of NIHSS score

NIHSS scores showed no significant difference between the two groups of patients before treatment ($P > .05$), whereas they differed significantly after 8 weeks of treatment ($P < .05$). After treatment, a decrease of 54.66% and 69.32% in the scores was observed in control group and experimental group, respectively (Table 4 and Figure 4).

DISCUSSION

The results of this trail indicated that the TCM five-element music therapy combined with mirtazapine had substantial contribution to depression and limb function recovery after ischemic stroke. Specifically, the depressive emotions of patients were relieved, the limb coordination was improved appreciably, and the stroke-induced functional impairment was reduced. Currently, stroke is the most common cause of nervous system disability and functional dependence on activities of daily living (ADL) in adults.[17] According to epidemiological surveys, cardiovascular and cerebrovascular diseases have surpassed malignant tumors,

Figure 1. There was no significant difference in age among the personnel selected for this experiment. Compared with the observation group, there were no significant differences in age, gender ratio, and sample size in the control group.

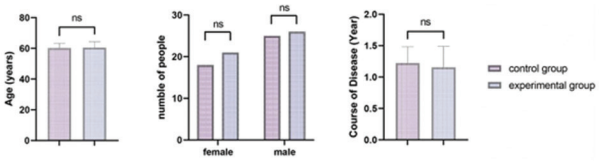
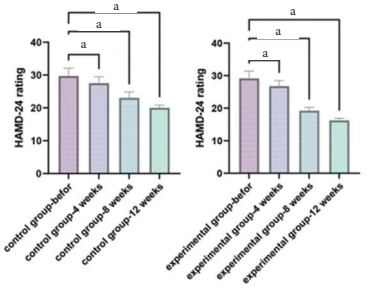
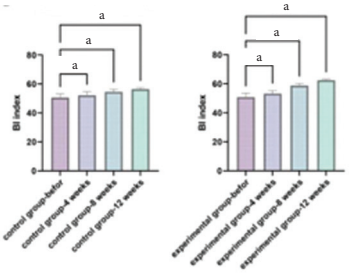


Figure 2. Compared with the observation group, the decrease in HAMD 24 score in the control group was significantly lower than that in the observation group, and $P > .05$. The score of the control group decreased more significantly.



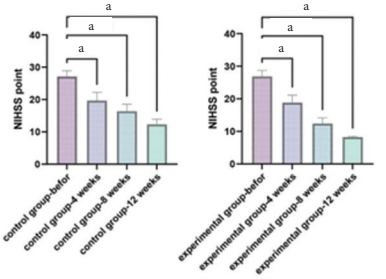
[a]*P* < .001.

Figure 3. Compared with the observation group, the increase in BI scores in the control group was significantly lower than that in the observation group, and $P > .05$. The score increase in the control group was greater.



[a]*P* < .001.

Figure 4. Compared with the observation group, the decrease in NIHSS score in the control group was significantly lower than that in the observation group, and $P > .05$. The score of the control group decreased more significantly.



[a]*P* < .001.

becoming the leading cause of death. Stroke is a common cardiovascular and cerebrovascular disease with a high morbidity rate. Despite significant changes in its diagnosis and treatment, acute ischemic stroke remains a devastating disease that poses substantial impacts on individuals, families, and health systems.[18] Although the mortality rate has been controlled due to the introduction of scientific diagnosis and treatment protocols for stroke in recent years, the complication rate of the disease remains fairly high.

The sequelae of ischemic stroke, particularly represented by limb disorder and PSD, increase the difficulty in behaviors of daily living, induce emotional depression affecting the quality of life, and produce negative emotions influencing the treatment status and cooperation of patients, thereby decreasing their compliance and exerting adverse effects on the prognosis treatment of the disease. Mirtazapine, launched as a prescription antidepressant in 1996,[19] is a common therapeutic drug for depression, which can effectively improve the conditions and states of patients with post-stroke anxiety and depression. Music therapy, a new phrase emerging in recent years, is a novel treatment scheme developed by modern TCM in conjugation with TCM theory. The five-element music therapy has a long history and extensive application. In TCM theory, the five viscera in the human body correspond to the five elements, so the five-element music therapy stimulates the five viscera in the human body through the sounds corresponding to the five elements, and harmonizes the five viscera, thereby ameliorating the psychological and physical states and functions of human beings. Such a therapy combined with the traditional clinical therapeutic drugs can not only improve the problems of long duration of and poor effects on sequelae and prognosis of patients with ischemic stroke, but also cope with the issues of prolonged simple medication, multiple side effects and reduced cooperation of patients.

CONCLUSION

In summary, for depression and limb function recovery after ischemic stroke, the TCM five-element music therapy combined with mirtazapine can preferably alleviate the negative emotions of the patients under anxiety and depression, help the patients to better express emotions, eliminate adverse physical and mental reactions, improve the compliance of patients, improve the speed and quality of prognosis treatment, and facilitate the rehabilitation of patients. Therefore, the prognostic approach of TCM five-element music therapy combined with mirtazapine for depression and limb function recovery after ischemic stroke should be promoted.

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