


Application of Psychotherapy Based on Five-Element Theory in Traditional Chinese Medicine in Improving the Mental States of Patients with Post-Stroke Depression

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Abstract

Background: This study aims to explore the clinical effect of psychotherapy based on five-element theory in traditional Chinese medicine (TCM) in improving the mental states of patients with post-stroke depression (PSD), to provide reference and guidance for clinical treatment.

Methods: A retrospective study was conducted on 163 PSD cases treated in The Second Affiliated Hospital, Hengyang Medical School, University of South China from January 2022 to January 2023. The patients treated with conventional treatment were included in the control group ($n = 84$), and patients receiving psychotherapy based on five-element theory in TCM and conventional treatment were classified as the observation group ($n = 79$). The anxiety levels, depression levels, TCM syndrome scores and sleep quality were compared in both groups. The enumeration data were tested by χ^2 test. Kolmogorov-Smirnov method tested whether the measurement data met normal distribution, and those did not meet normal distribution were tested by Mann-Whitney method. The difference was statistically significant at $p < 0.05$.

Results: After 4-week and 8-week treatments, the observation group had significantly lower scores of Hamilton Anxiety Scale ($z = -4.562, -6.765; p < 0.001$), Hamilton Depression Scale ($z = -7.588, -8.023; p < 0.001$), TCM

syndrome ($z = -7.138, -10.946; p < 0.001$), and Pittsburgh sleep quality index ($z = -6.819, -8.240; p < 0.001$) than the control group.

Conclusion: Psychotherapy based on five-element theory in TCM is beneficial to patients with PSD and can bring a certain clinical reference value.

Keywords

five-element theory in traditional Chinese medicine; psychotherapy; stroke; depression; mental state

Introduction

Cerebrovascular diseases remain the second leading cause of disability and death globally, and stroke belongs to cardiovascular diseases characterized by sudden onset of symptoms and clinical features [1,2]. Because stroke leads to damage and death of neural cells, and clinical manifestation include the deficiencies in affective prosody comprehension, understanding and expression of facial emotions, empathy, recognition of familiar faces, anxiety, apathy and psychosis [3,4]. Post-stroke depression (PSD) accounts for a considerable proportion of post-stroke complications, approximately one-third [5]. Medeiros Gustavo C *et al.* [6] have stated that PSD, a more common complication in stroke patients, is relevant to higher mortality, poorer recovery, more pronounced cognitive deficits and lower quality of life.

Nowadays, the clinical treatment of depression mainly relies on Western drugs that regulate monoamine neurotransmitters due to its complex pathogenesis, showing ap-

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parent drawbacks such as a single target, narrow antidepressant spectrum, slow onset of action, and high incidence of adverse effects. Traditional Chinese medicine (TCM) has a long history in understanding and treating depression, and has been widely used for centuries as a complementary and alternative medical therapy for depression [7]. The spiritual emotions of humans were categorized into happiness, anger, anxiety, thinking, sadness, fear, and shock in TCM. The seven emotions belong to five internal organs, that is to say, happiness is an emotional response of heart, anger is the emotional response of liver, thinking is an emotional response of spleen, sadness and anxiety are the emotional responses of lungs, and fear and shock are the emotional responses of kidneys. The five elements (wood, fire, earth, metal and water which match each inner organ in the human body), diagnose the lesions of the five internal organs in TCM [8]. The “seven emotions” correspond to five elements and five internal organs. Furthermore, based on the understanding of depression in TCM, from the view of “seven emotions”, patients with depression show excessive sadness (anxiety), thinking, fear (shock), which belongs to metal, earth and water, respectively. According to mutual restraint of five elements, fire restricting metal, wood restricting earth, and earth restricting water correspond to happiness over sadness, anger over thinking, and thinking over fear, respectively. Psychotherapy based on five-element theory in TCM is not limited to simple mental problems, nor one-sided physical changes. Still, it is committed to improving the physical and mental health of patients. This study aims to further analyze the application effect of psychotherapy based on five-element theory in TCM for patients with PSD through a retrospective study, in the hope of providing more new directions for the selection of subsequent treatment plans.

Materials and Methods

Study Subjects

As a retrospective study, this study selected 172 PSD patients admitted to The Second Affiliated Hospital, Hengyang Medical School, University of South China between January 2022 and January 2023, excluded 9 cases that did not meet the inclusion criteria, and included remaining 163 cases. The study subjects were divided into the control group (n = 84) and the observation group (n = 79) according to different clinical treatment schemes. Both groups were given conventional treatment, and psychotherapy based on five-element theory in TCM was added to the observation group additionally.

This study conformed to the relevant requirements of Declaration of Helsinki [9]. This study has been approved by the ethical committee of The Second Affiliated Hospital, Hengyang Medical School, University of South China (approval no.: 2024007).

Inclusion and Exclusion Criteria

Inclusion criteria. (1) Patients met the diagnostic criteria for PSD in International Classification of Diseases by the World Health Organization (WHO) [10]. (2) Patients had complete clinical data. (3) The age of patients was ≥ 18 years old. (4) Patients were diagnosed with stroke for the first time and had no history of mental disorders such as depression before stroke. (5) Patients who were in rehabilitation period had stable vital signs, and no serious intellectual damage and aphasia.

Exclusion criteria. (1) Patients with suicidal tendency; (2) those in gestation or lactation period; (3) those with acute stroke; (4) those with depression because of neurasthenia and schizophrenia; (5) those with the history of drug/alcohol dependence or abuse; (6) those with cardiovascular diseases like heart failure and myocardial infarction; (7) those with malignant tumors, familial hereditary mental disorders, brain injury and other diseases; (8) those with incomplete clinical data; and (9) those who underwent antidepressant therapy within two weeks.

Study Methods

This study collected patients' medical data such as gender, age, and course of PSD through the electronic medical records.

Control Group

For conventional treatment in Western medicine, fluoxetine hydrochloride capsules (NMPA approval No.: J2010001; specification: 20 mg; manufacturer: Patheon France, Bourgoin Jallieu, France) were taken at an oral dose of 20 mg, once a day, with continuous treatment for 8 weeks.

Observation Group

On the basis of the control group, psychotherapy based on five-element theory in TCM was applied for 8-week treatment, and the specific process was as follows.

Table 1. Comparison of demographic characteristics of the two groups [M (P₂₅, P₇₅), n(%)].

Items	Observation group (n = 79)	Control group (n = 84)	χ^2/z	<i>p</i>
Gender			0.002	0.966
Male	43 (54.43)	46 (54.76)		
Female	36 (45.57)	38 (45.24)		
Average age [years, M (P ₂₅ , P ₇₅)]	54.00 (45.00, 61.00)	55.00 (44.00, 62.00)	-0.434	0.665
Course of PSD [months, M (P ₂₅ , P ₇₅)]	6.00 (4.00, 8.00)	6.00 (3.00, 8.00)	-0.245	0.807
Types of stroke			0.005	0.946
Hemorrhagic stroke	25 (31.65)	27 (32.14)		
Ischemic stroke	54 (68.35)	57 (67.86)		
BMI [kg/m ² , M (P ₂₅ , P ₇₅)]	25.00 (22.00, 28.00)	24.00 (22.00, 27.75)	-1.568	0.117
Places of residence			0.002	0.966
Urban area	36 (45.57)	38 (45.24)		
Rural area	43 (54.43)	46 (54.76)		
Smoking history			<0.001	0.995
Yes	31 (39.24)	33 (39.29)		
No	48 (60.76)	51 (60.71)		
Drinking history			<0.001	0.989
Yes	33 (41.77)	35 (41.67)		
No	46 (58.23)	49 (58.33)		
Educational levels			0.023	1.000
College and above	15 (18.99)	16 (19.05)		
Junior college	16 (20.25)	17 (20.24)		
Senior high school	13 (16.46)	14 (16.67)		
Junior high school	25 (31.65)	27 (32.14)		
Primary school and below	10 (12.66)	10 (11.90)		

PSD, post-stroke depression; BMI, body mass index.

Table 2. Comparison of HAMA scores in both groups [M (P₂₅, P₇₅), points].

Groups	Before treatment	After 4-week treatment	After 8-week treatment
Observation group (n = 79)	34.00 (29.00, 37.00)	22.00 (18.00, 31.00)	16.00 (12.00, 21.00)
Control group (n = 84)	34.00 (29.25, 38.75)	28.00 (23.00, 33.75)	22.00 (19.00, 27.00)
<i>z</i>	-0.471	-4.562	-6.765
<i>p</i>	0.638	<0.001	<0.001

HAMA, Hamilton Anxiety Scale.

(1) “Happiness over sadness” treatment. By telling stories, speeches and other measures, patients were guided to obtain a positive and pleasant mood. The patients could also be encouraged to listen to relaxed and pleasant music, and watch relaxed and humorous movies, to break through the long-standing sadness. It was necessary to understand the interests and hobbies of patients, such as music, painting, dance and sports, and encourage patients to participate in activities of interest. In addition, the companionship of family members was vital for patients, which could encourage patients to carry out outdoor activities or watch the scenery with their families, and increase the time for family companionship and communication.

(2) “Anger over thinking” treatment. Physicians used various means to infuriate patients, such as humiliation and ridicule, so that patients could vent their anger. However, it was important to protect both physicians and patients by fully understanding patients’ personalities before infuriating patients, predicting their post-stress behaviors, conferring with their families to gain informed consent and recognition, and formulating the criteria for terminating the experiments promptly.

(3) “Thinking over fear” treatment. Clinicians could encourage patients to speak out the fearful things, and make a reasonable explanation by corporate consideration to eliminate patients’ excessive fear and feel the temporary extinction of fear. Then, it was necessary to repeat the stim-

Table 3. Comparison of HAMD-24 scores in both groups [M (P₂₅, P₇₅), points].

Groups	Before treatment	After 4-week treatment	After 8-week treatment
Observation group (n = 79)	41.00 (38.00, 45.00)	22.00 (18.00, 27.00)	15.00 (10.00, 20.00)
Control group (n = 84)	41.00 (39.00, 45.00)	30.50 (25.00, 35.00)	25.00 (19.25, 29.75)
<i>z</i>	-0.207	-7.588	-8.023
<i>p</i>	0.836	<0.001	<0.001

HAMD-24, Hamilton Depression Scale.

Table 4. Comparison of TCM syndrome scores in both groups [M (P₂₅, P₇₅), points].

Groups	Before treatment	After 4-week treatment	After 8-week treatment
Observation group (n = 79)	33.00 (29.00, 36.00)	24.00 (21.00, 28.00)	12.00 (10.00, 16.00)
Control group (n = 84)	32.00 (29.25, 37.00)	30.00 (27.00, 33.00)	23.00 (20.00, 25.00)
<i>z</i>	-0.115	-7.138	-10.946
<i>p</i>	0.908	<0.001	<0.001

TCM, traditional Chinese medicine.

ulus that made the patients fearful, so that patients would look straight at the problems and think about what they were afraid of, and gradually increase the amount of stimulus until the patients no longer felt fear.

Observation Indexes and Measurement Methods

The levels of anxiety and depression, TCM syndrome scores, and sleep quality of the two groups were measured before treatment, and at weeks 4 and 8 after the start of treatment, with the specific measurement methods summarized as follows.

(1) Anxiety level. The Hamilton Anxiety Scale (HAMA) [11] was used for measuring the anxiety level. Each item in the scale adopted a five-level scoring method (0–4 points), and the total score ranged from 0 to 56 points. The higher score indicated more severe anxiety level in patients.

(2) Depression level. The Hamilton Depression Scale (HAMD-24) [12] was used. Most of the items in this scale were recorded as 0–4 points, and other items were recorded as 0–2 points, with the score range of 0–64 points. The higher score showed more severe depression level in patients.

(3) TCM syndrome scores. During TCM consultation, patients' symptoms were quantitatively scored to understand their states of mind and pathological feelings [13]. Primary symptoms included depression, retardation of thinking, and vexation and irritability, and the scoring criteria were 0, 2, 4, and 6 points, corresponding to normal, mild, moderate, and severe symptoms, respectively. Secondary symptoms included insomnia, dreaminess, inap-

petence, fatigue, hypochondrium distending pain, and sexual dysfunction, etc., and the scoring criteria were 0 point (normal), 1 point (mild), 2 points (moderate), and 3 points (severe). The higher score showed more serious clinical symptoms in patients.

(4) Sleep quality. The Pittsburgh sleep quality index (PSQI) [14] consisting of 19 self-assessment questions and 5 questions rated by sleep peers was used, and only the self-assessment questions were scored, with a total of 7 dimensions. 0 point referred to no difficulty and 3 points indicated great difficulty. The scale score ranged from 0 to 21 points. The higher scores indicated poorer sleep quality.

To ensure the objectivity of the scale scores, the scores of each scale in this study were independently evaluated by three experienced testers who were able to master the measurement specifications of the scale. If there was a large difference in the scores of the three testers, the abnormal situation was firstly discussed, and then the second test was carried out when the opinions were consistent. The final score was based on the mean value of the three testers.

Statistical Analysis

This study chose professional statistical software SPSS (version: 26.0; manufacturer: International Business Machines Corporation; origin: Armonk, New York, USA) to process the data obtained from this study. The enumeration data including gender, types of stroke, places of residence, smoking history, drinking history and educational levels were tested by χ^2 test, expressed as [n (%)]. Kolmogorov-Smirnov method tested whether the measurement data met normal distribution, and the measurement data conforming to non-normal distribution were expressed

Table 5. Comparison of PSQI scores in both groups [M (P₂₅, P₇₅), points].

Groups	Before treatment	After 4-week treatment	After 8-week treatment
Observation group (n = 79)	18.00 (17.00, 20.00)	11.00 (10.00, 13.00)	6.00 (2.00, 8.00)
Control group (n = 84)	18.50 (16.25, 20.00)	15.00 (12.00, 18.00)	10.50 (8.00, 16.00)
<i>z</i>	-0.482	-6.819	-8.240
<i>p</i>	0.630	<0.001	<0.001

PSQI, Pittsburgh sleep quality index.

as M (P₂₅, P₇₅), including age, course of PSD, body mass index (BMI), anxiety level, depression level, TCM syndrome scores and sleep quality. The data between groups were compared using Mann-Whitney method. The difference was statistically significant when $p < 0.05$.

Results

Baseline Data

The study shed light on no significant difference in baseline data such as gender, age and course of PSD through collecting these data by means of interview method and questionnaire survey ($p > 0.05$), which are detailed in Table 1.

Comparison of Anxiety Levels in Both Groups

No significant difference in HAMA scores existed in both groups before treatment ($p > 0.05$). After 4-week and 8-week treatments, the observation group showed significantly lower HAMA score than the control group ($p < 0.001$), showing a statistical difference between the two groups, as shown in Table 2.

Comparison of Depression Levels in Both Groups

There was no significant difference in HAMD-24 scores between the two groups before treatment ($p > 0.05$). After 4-week and 8-week treatments, the observation group showed significantly lower HAMD-24 score than the control group ($p < 0.001$), showing a statistical difference between the two groups, as detailed in Table 3.

Comparison of TCM Syndrome Scores between the Two Groups

The inter-group comparison showed no significant difference in TCM syndrome scores before treatment ($p > 0.05$). After 4-week and 8-week treatments, the observation group showed significantly lower TCM syndrome

score than the control group ($p < 0.001$), showing a statistical difference between the two groups, as detailed in Table 4.

Comparison of Sleep Quantity in Both Groups

Before treatment, there was no significant difference in PSQI scores between the two groups ($p > 0.05$). After 4-week and 8-week treatments, the observation group showed significantly lower PSQI score than the control group ($p < 0.001$), showing a statistical difference between the two groups, as detailed in Table 5.

Discussion

Population aging and cumulative risk factors lead to a significant increase in the prevalence of stroke in some countries [15]. The latest data from Potter Thomas B H *et al.* [16] suggest an increase in ischemic and hemorrhagic strokes in younger people. The main symptoms of PSD are depression, dysphoria and vegetative signs, such as sleep disorders and decreased energy level, which can be used as an important indicator to predict adverse outcomes after stroke [17]. Huangdi Neijing first records depression and discusses its pathogenesis in detail [18]. TCM has been involved in the intervention of depression for decades, which has greatly enriched the treatment of PSD [19]. Therefore, it is feasible to seek an effective method for the treatment of PSD from the TCM.

Firstly, the present study revealed lower scores of HAMA and HAMD-24 in the observation group than the control group after treatment, indicating that psychotherapy based on five-element theory in TCM significantly improves patients' anxiety and depression. The reasons of study results were explained as follows. Under the restriction among five elements in TCM, for patients who are trapped in a certain negative psychological state and have a series of mental illnesses, doctors consciously induce one emotion to suppress, improve or eliminate negative expression of another abnormal emotion, thereby breaking the vicious cycle between physical and mental harms and gradu-

ally guiding patients to get rid of the negative psychological state. The various means were adopted to stimulate patients' another emotion, and effectively eliminate abnormal emotions suppressed in patients. The study from Lin Facai *et al.* [20] has shown that music therapy based on five-element theory in TCM can effectively reduce anxiety and depression scores in patients with PSD, confirming the clinical efficacy of five-element theory in TCM, which is consistent with the results obtained in this study. Zhou Qun *et al.* [21] have shown that emotional management based on five-element theory in TCM can reduce the anxiety and depression levels and improve the negative emotions of patients.

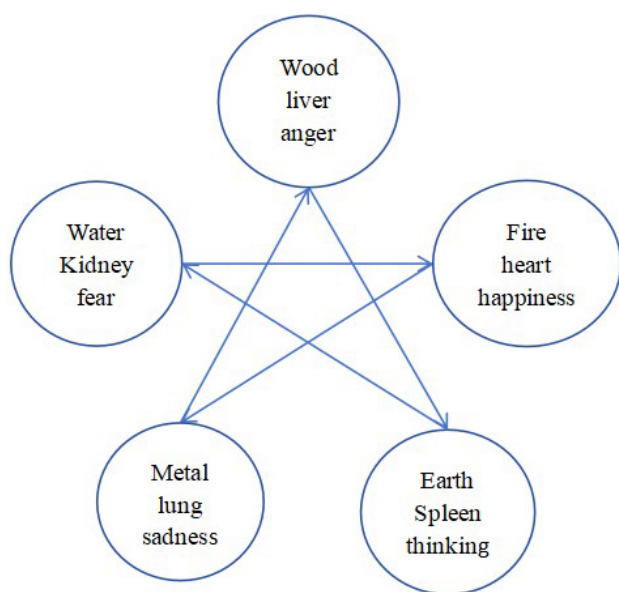


Fig. 1. Restriction of seven emotions and five elements.

Secondly, the scores of TCM syndrome and PSQI were lower in the observation group than the control group after treatment, showing that psychotherapy based on five-element theory in TCM significantly improves the sleep quality and TCM symptom score of patients. The reasons for these results were explored. The “seven emotions” correspond to five elements and five internal organs, and the changes in five internal organs also conform to the rule of restriction among five elements, namely, one emotion can constrain its victorious emotion according to the rule of five elements. Under the circumstances, the former could correct the negative emotions caused by the latter, also further harmonize the imbalance of yin, yang, qi, and blood in the human body, thereby curing physical diseases caused by negative emotions (Fig. 1). Psychotherapy based on five-element theory in TCM recognizes the relationship between emotions and physical symptoms, emphasizing the unity of

body and mood. Therefore, multiple TCM psychotherapies have been widely used in clinic for correcting abnormal emotions and achieving overt therapeutic effects on physical symptoms. The clinical study conducted by Du Yi *et al.* [22] has found that emotional and physical symptoms in patients with severe depression are more severe than those with moderate depression, further confirming the association between mental states and physical symptoms. Zheng Haofang [23] showed that the five-element music therapy in TCM improved sub-health problems of patients who could not sleep due to excessive tension, and enhanced the sleep quality of patients. The results are similar to the results of this study.

The limitations of this study included that the patients in both groups were not treated at the same time, which may affect the accuracy of the results, and the number of patients included in this study was not large enough due to the limitation of time and funds, so the sample size needs to be increased in the later study.

Conclusion

Psychotherapy based on five-element theory in TCM is beneficial for patients with PSD and can provide a reference for the clinical treatment of PSD.

Availability of Data and Materials

The original contributions presented in the study are included in the article. Further inquiries can be directed to the corresponding author.

Author Contributions

LXX designed the study; both authors conducted the study; YLZ collected and analyzed the data. LXX and YLZ participated in drafting the manuscript, and both authors contributed to critical revision of the manuscript for important intellectual content. Both authors gave final approval of the version to be published. Both authors participated fully in the work, take public responsibility for appropriate portions of the content, and agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or completeness of any part of the work are appropriately investigated and resolved.

Ethics Approval and Consent to Participate

This study has been approved by the ethical committee of The Second Affiliated Hospital, Hengyang Medical School, University of South China (approval no.: 2024007). The informed consent has been obtained from patients.

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Conflict of Interest

The authors declare no conflict of interest.

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