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Article

The influence of two taijiquan exercises on the negative emotions of the elderly

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Abstract: Purpose: Exploring the influence of 24-style Tai Chi and Tai Chi eight methods and five steps on the negative emotions of the elderly. **Methods:** 101 elderly people were divided into 24-style Tai Chi group, Tai Chi eight methods and five steps group, and jogging and fast walking group. 3 times a week, 1 h each time, continuous exercise for 8 weeks. The Self-rating Anxiety Scale (SAS) and Self-rating Depression Scale (SDS) of each group were observed before and after intervention. **Results:** There were significant differences in the levels of anxiety ($p < 0.001$) and depression ($p < 0.01$) in the 24-style Tai Chi group before and after the experiment, especially the anxiety had reached extremely significant level. There were significant differences in the levels of anxiety ($p < 0.001$) and depression ($p < 0.05$) in the Tai Chi eight methods and five steps group before and after the experiment, especially anxiety had reached extremely significant level. There was no significant difference between the anxiety ($p > 0.05$) and depression ($p > 0.05$) levels in the jogging and fast walking group before and after the experiment. **Conclusion:** 24-style Tai Chi and Tai Chi eight methods and five steps can effectively improve the level of anxiety and depression in the elderly and alleviate negative emotions.

Keywords: taijiquan; negative mood; anxiety depression; elderly

1. Introduction

With the rapid economic development, population aging has become a hot issue at home and abroad. Foreign studies on aging mainly include: spatial distribution and evolution of aging [1], and health of the elderly [2]. In addition, developed countries such as Japan and Germany, which have a serious aging problem, have alleviated the phenomenon of population aging by implementing the reform of the pension system and actively promoting the employment of the elderly. The problem of aging in China has attracted wide attention, and mental health is an important aspect of the healthy development of the elderly, as well as an important factor affecting the quality of life of the elderly [3]. As China gradually enters the middle aging society, it presents a "four super" trend, which is manifested as super scale, super fast speed, super high level and super stability [4], resulting in a particularly severe aging situation. The incidence of anxiety and depression in the elderly is constantly increasing [5], and negative emotions are constantly increasing, which seriously threatens the physical and mental health of the elderly. The negative emotions of the elderly are easy to occur, usually due to the following reasons: From the perspective of the elderly themselves, the elderly retire from the job, from the contributor of

social value to the user of social value results, the role change thus forms a sense of self-worth, weakened sense of existence. Some elderly people stay in pension institutions and leave the living area for a long time, not only to bear the inconvenience caused by physical decline, aging and even chronic diseases, but also to adapt to the living environment of pension institutions and unfamiliar groups. In old age, people who are slightly unwell will have doubts about their physical function and health, which is easy to cause negative emotions [6]. They are usually nervous about their physical health, alert to any possible disease symptoms, and even feel uneasy and worried about normal heartbeat changes, muscle aches, colds and fever, and generally produce negative emotions [7]. Therefore, it is very necessary to pay attention to the mental health of the elderly, improve the level of negative emotions of the elderly and improve the quality of life of the elderly to promote the health and longevity of the elderly and alleviate the aging problem in China. The Outline of the Healthy China 2030 Plan proposes to "vigorously develop sports that are popular with the people, and support the promotion of traditional ethnic folk sports such as Taijiquan and fitness Qigong" [8]. As one of the most popular traditional sports in China, Taijiquan is deeply loved by the elderly. 24-style Tai Chi, also known as Simplified Tai Chi, which was adapted from the essence of Yang's Tai Chi by the former State Sports Commission in 1957, is simple, easy to learn, easy to practice and easy to promote [9]. The eight methods and five steps of Tai Chi was created by Professor Yunjun Lv of Beijing Normal University after the 24-style Tai Chi, and its core is "eight methods and five steps", which is also a simple medical introduction routine of Tai Chi [10]. A large number of studies have shown that physical exercise, as an effective means to improve health, can also promote the mental health of the elderly [11]. The implementation of long-term, gradual exercise can promote the elderly to adapt to the new environment and groups as soon as possible, so as to avoid social fear in the life of social groups. In addition, long-term exercise can improve the physical condition of patients and increase the immunity of the elderly, and the improvement of physical condition is also helpful to the improvement of psychological condition [12]. The group characteristics of physical exercise can bring old people with the same hobby characteristics together, provide activity and communication space, and express emotions and relieve negative emotions through communication and communication. Regular sports activities can help the elderly find their life goals, regain confidence in life, and improve life satisfaction [13]. Regular physical exercise increases the positive emotional experience of joy and optimism in the elderly, and reduces the negative emotions of anger and excitement [14].

Therefore, scientific exercise can effectively improve the mental health level of the elderly [15]. Over the years, many scholars generally believe that physical exercise is an effective intervention means to promote the development of mental health of the elderly. The concept of "exercise is a good medicine" has been widely recognized by the people. Many studies have shown that physical exercise has a significant positive impact on the prevention and treatment of certain physical and mental diseases. Individuals according to their own needs, through exercise can enhance physical fitness, improve health, promote physical and mental development. In general, older people who are physically active are better at expressing their

emotions [16]. As one of the current popular fitness methods for the elderly, Taijiquan can improve breathing and nervous system, improve immunity, healthy body, cultivate spirit, and cultivate both body and mind. This study explores the influence of 24-style Tai Chi and Tai Chi eight methods and five steps on the negative emotions of the elderly, and provides reference value for the elderly and related nursing institutions to participate in exercise.

2. Research objects and methods

2.1. Research objects

All 101 seniors were from the Senior Sports Association of Gusu District, Suzhou City. Inclusion criteria: no physical disability, no major organic disease, no history of mental illness; with my consent and signed informed consent. The aged people were divided into 24-style Tai Chi group (34 people), Tai Chi eight methods and five steps group (34 people) and the jogging and fast walking group (33 people) by random cluster sampling method. The three groups had no statistical difference in age, sex, education level, occupational status, marital status, living status, health status and pension status, and were comparable (**Table 1**).

Table 1. 24-type Tai Chi group, Tai Chi eight methods and five steps group, and the jogging and fast walking group demographic variables.

Demographic variables information	24-style Tai Chi group (n = 34)	Tai Chi Eight methods and five step group (n = 34)	Jogging and fast walking group (n = 33)	F	p
Sex	1.82 ± 0.39	1.71 ± 0.46	1.70 ± 0.47	0.87	0.42
Age	66.09 ± 5.04	67.41 ± 4.51	65.06 ± 4.07	2.24	0.11
Educational level	2.65 ± 0.73	2.68 ± 0.64	2.70 ± 0.85	0.04	0.96
Occupational situation	1.91 ± 1.30	1.68 ± 1.25	1.45 ± 1.03	1.38	0.26
Marital status	3.00 ± 1.33	3.53 ± 1.02	3.45 ± 1.09	2.09	0.13
Living condition	1.85 ± 0.36	2.00 ± 0.35	1.93 ± 0.50	1.13	0.33
Health condition	1.24 ± 0.43	1.12 ± 0.33	1.24 ± 0.44	1.04	0.36
Pension status	1.15 ± 0.36	1.15 ± 0.36	1.12 ± 0.33	0.06	0.94

2.2. Measurement tools

This research questionnaire consists of three parts:

(1) Demographic variables questionnaire, including gender, age, education level, occupational status, marital status, living status, health status and pension status.

(2) Self-rating Anxiety Scale (SAS) is a clinical measurement tool designed by Zung in 1971 to assess patients' subjective symptoms of anxiety [17]. It is now widely used for the assessment of anxiety levels in the elderly. The scale is composed of 20 items, each item is classified into 1~4 grades according to the feeling of the latest week, and the cumulative score of each item is the total SAS score. The total score is multiplied by 1.25, and the standard score is taken as an integer. The higher the score, the greater the anxiety [18].

(3) Depression Self rating scale (Self-rating Depression Scale, SDS) is a clinical measuring tool compiled by Zung in 1965 for assessing patients' depression [19]. It

is one of the commonly used scales for measuring the level of the elderly depression scale. The scale consists of 20 items, including physical disorders, psychological disorders, psychomotor disorders, emotional disorders and other specific symptoms. Each item is rated on a scale of 1 to 4 based on the feeling of the last week, and the cumulative score of each item is the total SDS score. The total score is multiplied by 1.25, and the standard score is taken as an integer. The higher the score, the greater the tendency to depression.

2.3. Implementation procedure

Before the formal experiment began, the homogeneity test was carried out to ensure that there was no difference in the experiment, and then the experiment was carried out. Before the formal test, the investigators involved in the study were uniformly trained, including guidance, SAS, SDS scale content, investigator's responsibilities and precautions. During the formal test, the investigator introduced the guidance in detail to the elderly subjects, and monitored the quality of the elderly filling in the questionnaire. In order to ensure the authenticity and reliability of the data, we have equipped special investigators to conduct individual tests for the elderly who cannot complete the scale independently.

From March to May 2021, professional staff of the Association will guide the scientific exercise of Taijiquan and jogging fast walking group. The experimental group of 24-type Tai Chi performed the 24-type Tai Chi exercise three times a week, with complete and repeated exercises for 4 times each time, with an interval of 5 min and 1 h each time, and exercised continuously for 8 weeks. The experimental group of Tai Chi eight methods and five steps underwent Tai Chi eight methods and five steps exercise, three times a week, 1 h each time, for 8 weeks. The jogging and fast walking control group took jogging and fast walking exercise, 3 times a week, 1h each time, without stopping in the middle, continuous exercise for 8 weeks. After the experiment, the investigators collected the post-test data of the elderly subjects.

2.4. Data processing and analysis

SPSS 26.0 software was used for data sorting and statistical analysis. Statistical methods include descriptive statistics, paired sample *t* test and *F* test.

3. Results and discussions

3.1. Comparison of negative emotion level in each group before the experiment

Before the experiment, there was no statistical difference in the anxiety and depression levels in the 24-style Tai Chi group, the Tai Chi eight methods and five steps group and the jogging and fast walking group ($p > 0.05$). The homogeneity test results of negative emotion level in each group are shown in **Table 2**.

Table 2. Comparison of the level of negative emotion in each group before the experiment.

Index	24-style Tai Chi group (n = 34)	Tai Chi eight methods and five step group (n = 34)	Jogging and fast walking group (n = 33)	F	p
Anxiety	56.99 ± 15.87	55.29 ± 7.72	57.29 ± 9.18	0.29	0.75
Depressed	54.71 ± 13.08	51.89 ± 9.41	54.81 ± 8.74	0.83	0.44

3.2. Comparison of negative emotion level before and after the experiment in each group

There were significant differences in the levels of anxiety ($p < 0.001$) and depression ($p < 0.01$) in the 24-style Tai Chi group before and after the experiment, especially the anxiety had reached extremely significant level. Since a score of less than 50 is normal, and 50~60 is mild anxiety and depression, it can be seen from **Table 3** that before the experiment, the scores of anxiety and depression in the 24-style Tai Chi group were both in a mild state, but after the experiment, the anxiety and depression levels of the subjects in this group returned to normal, indicating that 24-style Tai Chi can significantly improve the anxiety and depression levels of the elderly and effectively alleviates negative emotional experiences.

Table 3. 24-style Tai Chi group before and after the experiment comparison of negative emotion level.

Index	Before the experiment	Post-experiment	t	p
Anxiety	56.99 ± 15.87	43.90 ± 9.24	4.25	0.000
Depression	54.71 ± 13.08	47.06 ± 12.33	2.88	0.007

There were significant differences in the levels of anxiety ($p < 0.001$) and depression ($p < 0.05$) in the Tai Chi eight methods and five steps group before and after the experiment, especially anxiety had reached extremely significant level. As can be seen from **Table 4**, before the experiment, the scores of anxiety and depression in the eight methods and five steps group were in a mild state, but after the experiment, the anxiety and depression levels of the subjects in this group returned to a normal state, indicating that the Tai Chi eight methods and five steps can significantly improve the anxiety and depression levels of the elderly and effectively alleviate negative emotional experience.

Table 4. Comparison of negative emotion level before and after Tai Chi eight methods and five steps group.

Index	Before the experiment	Post-experiment	t	p
Anxiety	55.29 ± 7.72	44.30 ± 7.07	5.63	0.000
Depression	51.89 ± 9.41	47.39 ± 7.62	2.19	0.036

There was no significant difference between the anxiety ($p > 0.05$) and depression ($p > 0.05$) levels in the jogging and fast walking group before and after the experiment. As can be seen from **Table 5**, before and after the experiment, the scores of anxiety and depression in the jogging and fast walking group were both in a mild state, but the scores after the experiment were lower than those before the

experiment, indicating that the jogging and fast walking can improve the anxiety and depression of the elderly to a certain extent, but the effects are not more obvious than 24-style Tai Chi and Tai Chi eight methods and five steps.

Table 5. Comparison of negative emotion level in the jogging and fast walking group before and after the experiment.

Index	Before the experiment	Post-experiment	*t*	*p*
Anxiety	57.29 ± 9.18	55.61 ± 11.79	0.61	0.547
Depression	54.81 ± 8.74	52.47 ± 10.28	0.99	0.331

3.3. Discussions

In recent years, with the speeding up of our country's aging process, the health problems of the elderly have become increasingly prominent. With the increasing age of the elderly, their physiological function and physical health gradually decline, and long-term chronic diseases are accompanied by mental health problems [20]. This mental health problem is plagued by negative emotions, with anxiety and depression being the most common. Due to illness, retirement and negative life events, the elderly will reduce the enjoyment of life, produce negative and pessimistic emotional experience about the future, and produce anxiety and depression symptoms such as depression, tension and hypochondriasis, which are very common in the elderly [21]. They lack a sense of value and companionship, can not find the value of their own existence in the future life, and feel more lonely and helpless. With the gradual increase of life pressure, the incidence of anxiety and depression also shows a gradually increasing trend [22], which leads to the tendency of the elderly to commit suicide, and then seriously threatens the physical and mental health of the elderly in their later years [23]. Physical exercise is a convenient and inexpensive way to help older people improve their physical performance, increase the interest of the elderly, expand the range of interpersonal communication of the elderly, relieve the level of negative emotions, and maintain good mental health.

First of all, physical activity three or more times a week can be called regular exercise. Previous studies have shown that regular physical activity can reduce the incidence of depression and improve physical health. According to the viewpoint of physical exercise on emotion regulation mechanism, physical exercise can induce positive emotions and thoughts, and these positive emotions and thoughts will have a resistance effect on anxiety, depression and other negative emotions [24]. Studies have shown that Taijiquan can improve the mental health of the elderly [25]. Through sports activities, the elderly can improve their ability to deal with emotional problems, and can adopt effective emotional management strategies to solve emotional troubles. The use of two stress management behavioral strategies, "transfer" and "release", is initiated during the activity." By participating in interesting activities, the negative emotions are transferred, so that the elderly can re-evaluate their negative emotions in a positive way. This "shifting" coping style reduces attention to stressors and relieves bad emotions such as anxiety and depression. Such as "martial arts", "Tai Chi" and other fun sports activities active the atmosphere of the scene, cheerful, free, relaxed atmosphere to help the elderly relax

their nervous mood, enjoy the release of their negative emotions. Secondly, sports activities require the elderly to actively communicate and cooperate with other participants, need mutual understanding, respect and cooperation, relieve the estrangement generated in interpersonal communication, enhance the friendship of friends, good friendship of friends can increase the channels for each other to accompany and talk about emotions, reduce and eliminate the tension, anxiety, depression and other negative emotions brought by the external environment.

Taijiquan is a kind of aerobic fitness activity that can control its intensity and has a beneficial effect on the improvement of people's mental state [26]. The movements of Taijiquan are gentle and focus on regulating breath and qi. Anxiety is a diffuse, unpleasant, vague feeling of worry that is caused by an internal conflict in the mind. Existing research shows that 2 months of Tai Chi exercise can play a significant role in regulating the anxiety state of college students. Compared with aerobics, yoga and other exercise programs, it is found that Taijiquan can improve the anxiety level of college students more significantly [27]. Depression is a long-term emotional state of low mood, which makes the body always in a state of sub-health. Existing studies have shown that Taijiquan has a good regulating effect on individual depression [28]. 24-style Tai Chi and Tai Chi eight methods and five steps can effectively improve the anxiety and depression level of the elderly. During the practice process, both groups of Tai Chi experimental groups required emotional peace, which itself is a kind of adjustment to the psychological state.

Second, interpersonal skills, as one of the important factors affecting the enthusiasm of physical exercise, can promote and reinforce the generation of individual physical exercise behavior. The elderly with strong interpersonal skills are more likely to get pleasure and satisfaction from physical exercise and actively participate in group physical exercise activities. They usually have a greater ability to cooperate and interact, and thus persist in physical exercise [29]. Relevant studies have shown that interpersonal skills not only have a positive impact on individuals' adherence to physical exercise [30], but also affect the diversity and persistence of individuals' participation in physical exercise [31]. Compared with individual exercise forms, the elderly who exercised in group form exercised more frequently and exercised more types. The group form of exercise not only increases the frequency and length of exercise, but also helps older people build closer social networks. At the same time, positive feedback and encouragement can be provided through interaction and cooperation with others, thus enhancing the motivation of individuals to continue to exercise [32]. While the elderly communicate with each other and communicate with each other to ensure the quality, it can also expand the social circle of the elderly, increase the positive emotional experience, and obtain more social support, so as to reduce the loneliness of the elderly to a certain extent and maintain a positive and optimistic attitude to healthy life. Therefore, sports activities can provide opportunities and space for the elderly to communicate in the group, express their feelings through communication with the surrounding people, alleviate their depression symptoms, regain confidence in life, and improve their quality of life [33]. In the process of physical exercise, the old 8 years can not only strengthen the body and slow down the rate of physical aging, but also experience the positive values such as freedom, equality, courage and perseverance, and

harmony transmitted by different sports at all times. These values will also make them have a more reasonable cognitive concept when facing their own health problems. As the pace of social life continues to accelerate, the health anxiety of the elderly not only affects their own happiness, but also may have a greater impact on their children and spouses, and may even destroy the normal family living environment. Reducing the health anxiety of the elderly through physical exercise has become a breakthrough to help the elderly achieve home security. Although the jogging fast walking group has improved the anxiety and depression level of the elderly, the effect is not as obvious as that of the 24-style Tai Chi group and the Tai Chi eight methods and five steps, and it does not reach the significant level, which may require a longer period of exercise to improve the negative emotions of the elderly.

And finally, in terms of exercise years, the longer the exercise years, the greater the amount of exercise will be, the better the rhythm of all aspects of the body, the better development of physical and mental functions, and the better promotion of physical and mental health level. However, with the increase of age, the physical functions of the elderly will decline, and the long-term 24-style Tai Chi group and eight methods and five steps of Tai Chi exercise will become a form of life. To a certain extent, it distracts the energy of the elderly. In this environment, older age groups may attach more importance to physical and mental health and thus actively participate in physical exercise, and both men and women may be more motivated to participate in physical exercise, thereby reducing the possibility of gender differences. In addition, older people may be less affected by gender roles and social pressures than other social groups. Increasing age and improving life may also reduce their expectations and pressure on society, thus allowing them to show greater freedom and flexibility in physical exercise.

In order to make the elderly achieve a greater psychological effect of exercise and improve the negative emotions of anxiety and depression, the elderly and relevant associations or institutions should reasonably arrange three or more times a week of Tai Chi exercise, according to their own needs and hobbies, choose 24-style of Tai Chi or Tai Chi eight methods and five steps.

This study has some limitations. The initial selection of the experimental group was based solely on the fact that it was a common exercise program for older adults and the assumption that it would improve anxiety and depression, and it did not adequately consider highlighting the advantages of Tai Chi by comparing it with an appropriate control group. In addition, the initial experimental design did not adequately address comparisons of effect sizes between different exercise programs, which prevented such comparisons from providing a clearer picture of the strengths of Tai Chi compared to other exercises in improving anxiety and depression in older adults, thereby compromising the overall assessment of Tai Chi. Although this study focused on the effects of Tai Chi on the mental health of older adults, the analysis of how Tai Chi affects the mental health of older adults through specific mechanisms (e.g., positive thinking, meditation, and respiratory regulation) was not in-depth enough to reveal in detail the underlying principles of Tai Chi's effects.

The follow-up study can compare the effect of Tai Chi with other exercise programs to clarify the advantages and strengths of Tai Chi in improving the mental

health of the elderly, so as to obtain more convincing research results. In-depth analysis of how Tai Chi affects the mental health of older adults through specific mechanisms (e.g., mindfulness [34], meditation, respiratory regulation, etc.) will provide a more thorough understanding of the rationale for Tai Chi's effects on older adults' mental health. Continuously assess the impact of Tai Chi on the quality of life of older adults through appropriate psychological scales, not only focusing on the psychological dimension but also expanding to physical health, social functioning, and other dimensions, in order to fully understand the changes in the lives of older adults brought about by the Tai Chi movement [35].

4. Conclusion

Long-term regular Tai Chi exercises can effectively improve the level of anxiety and depression in the elderly and alleviate negative emotions. When the elderly exercise, they should reasonably arrange the exercise frequency of Taijiquan and choose their own Taijiquan exercise items.

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