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Original Article

Group fitness exercise reduces recurrence of depression in patients after oral drug therapy

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Abstract: *Purpose:* To determine whether a long-term fitness program helps to reduce the recurrence rate of depression in patients after oral drug therapy. *Methods:* Eighty elderly patients with depression between the ages of 55 to 70 were selected and divided into an observation group and a control group, with each group consisting of 40 patients. Both groups received combined treatment with oral drugs and fitness exercise with each course of treatment lasting for 4 weeks and there were three courses at most. After the treatment, the clinical effect on the two groups of patients was evaluated. The patients in the control group stopped the oral drug and exercise at the same time, while the patients in the observation group continued their exercise after they stopped the drugs. To study differences between the two groups, the recurrence rate, quality of life, physical and mental functions, mental state and cognitive functions were analyzed. *Results:* During the 3 courses of treatment, the cure rates for the two groups showed no significant difference ($P>0.05$). However, the recurrence rate of the control group was obviously higher than that of the observation group ($P<0.05$) and the indicators for quality of life, physical and mental functions, mental state and cognitive functions of the observation group were better than those of the control group ($P<0.05$). *Conclusion:* For elderly with depression, if follow-up intervention by long-term exercise is given to the cured patients, their recurrence rate will be low and the indicators for their quality of life, physical and mental functions, mental state and cognitive functions will be enhanced. Intervention by a long-term fitness program after the patients are cured can consolidate the effect of the previous treatment.

Keywords: Depression, collective fitness exercise, long-term intervention, cured patients, effect

Introduction

Modern medicine labels depression as the cold in pathergasiology, suggesting that it tends to occur frequently. Most people consider it as an emotional disorder, also called mood disorder, which reflects a certain physical malfunction. Therefore, researchers are likely to define depression as a psychological disease mainly caused by kinds of unhappy psychological activity [1, 2]. With the advent of the aging society, the physical and mental functions of the elderly are significantly affected by such factors as their own health, their families and the society, so, the elderly tend to suffer depression. If the depression is not treated in a timely manner, it will become more serious with time and severely affect the physical and mental health and the daily quality life of the elderly, which will not only bring pains to the patients and their families, but produce poor results on subsequent treatment and rehabilitation. Hence, it is important to identify and treat the disease as early as possible [3, 4]. The measures which are often adopted to treat depression include oral drugs, psychological counseling, and a change of the living environment. However, in recent years, the importance and necessity of intervention has become an increasing concern to both the doctors and the patients. For example, according to relevant research [5, 6], oral drugs are unnecessary for those patients with mild depression, instead, intervention by such physical means as psychological counseling, change of the living environment, and exercise can produce more satisfactory effects on the patients. However, most of the data available only make theoretical and practical reports of the disease

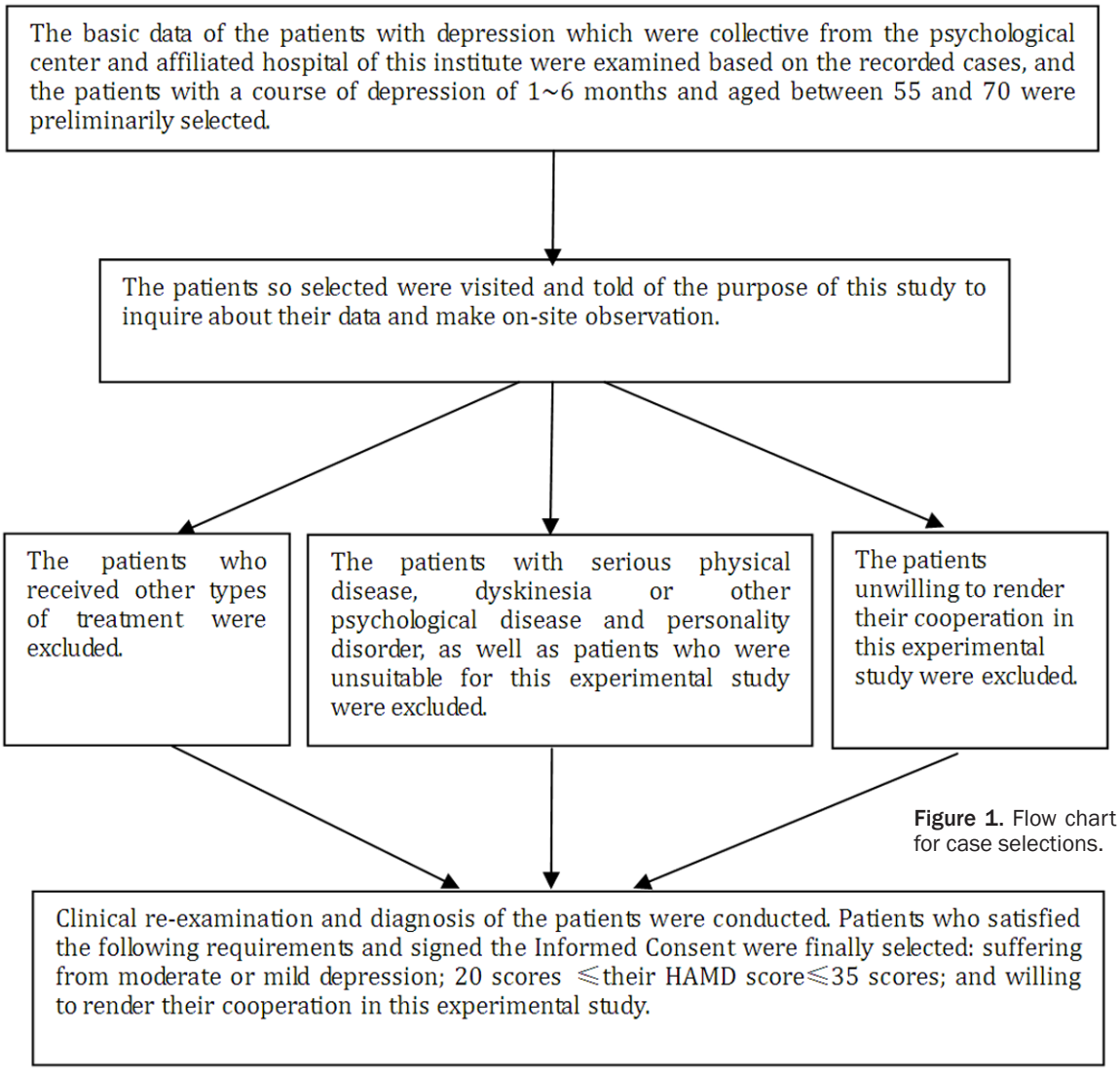

Figure 1. Flow chart for case selections.

from the perspective of treatment and pay little attention to the effect of the physical exercise following the recovery of the patients. This study on elderly patients with depression focused on treatment combining basic oral drugs with fitness exercise, in which long-term invention by means of exercise is given to the patients who stop taking drugs. This study observed the way exercise could consolidate the effect on the cured patients.

Data and method

Research data

First-hand data were obtained from the psychological center and the Psychiatry Department of the Affiliated Hospital and the experimental subjects were selected from the patients treated during the period between March and June 2015. Eighty patients with depression were selected as the objects of this study consisting of 40 women and 40 men who were at the age between 55 and 70 and had a course of disease of 1 to 6 months. All the selected patents met the diagnosis standard for depression set out in CCMD-3 and the inspection by Hamilton Depression Scale (HAMD) showed that HAMD Score of the patients was between 20 and 35, which meant that their depression was mild and at an early stage. They had no other obvious physical illness, pains, or radical acts. They also did not show any intention of suicide. **Figure 1** shows the selection process. The patients were randomly divided into an observation group and a control group with each group con-

Table 1. Comparison of the basic data of the two groups of patients ($\bar{x}\pm s$)

Group	Male/ Female	Age (years old)	Average course of disease (month)	HAMD score (score)	Seriousness (number)	
					Mild	Moderate
Control group	20/20	62.42±5.71	2.45±1.26	28.92±4.20	16	24
Observation group	20/20	61.80±5.80	2.60±1.34	29.31±4.25	15	25

Note: $P>0.05$.

sisting of 20 men and 20 women respectively. The difference between the data of the two groups of patients had no statistical significance ($P>0.05$) and had comparability (**Table 1**).

Methods for treatment

Treatment with drugs: The patients took Doxepin with reference to the specification and dose requirement and in strict accordance with the instructions of the doctors. Every dose contained about 10 mg of Doxepin which was taken one time every morning and every evening. Each course of treatment lasted for 4 weeks and would come to its end if the patients were cured, or continue if the patients were not cured, provided however that there were no more than 3 courses in total.

Fitness exercise: First, the fun and important nature of fitness exercise promotes the mental and physical health of elderly people. Exercise was introduced to the patients so as to psychologically guide and urge them to participate. Second, the patients were taken to watch fitness exercise for about 1 week to feel the pleasure of collective recreational activities and were taught the basic footwork and techniques. Third, after the patients learned the basic footwork and techniques, they participated in the exercise for practice. They practiced for about 1 hour each morning or evening and practiced for 5-6 times a week.

The control group received a combined treatment of drug and fitness exercise. At the end of each course, the treatment for the cured patents was stopped while those who were not cured continued to receive such treatment for no more than 3 courses. The same combined treatment was given to the observation group. However, after each course of treatment, the cured patients stopped taking drugs but continued to exercise while those who were not cured continued to receive such treatment for no more than 3 courses. After the whole process of treatment was over, a follow-up study of the two groups was conducted for 3 months to compare their recurrence rate, quality of life, physical and mental functions, mental state, and cognitive functions.

Evaluation of treatment effect

Evaluation was conducted before the treatment and after each course of treatment by using Hamilton Depression Scale (HAMD) and the treatment effect of each patient was demonstrated by the score-reducing rate = (score before the treatment-score after the treatment) ÷ score before the treatment × 100%. If the HAMD score-reducing rate was equal to or higher than 75% and the symptoms or signs of depression disappeared or basically disappeared with reference to the diagnosis standard for depression as set out in CCMD-3, the patients were deemed to have been cured.

Recurrence rate evaluated by the follow-up study

A follow-up study of all the cured patients of the two groups was conducted for 3 months and the patients were re-examined after 3 months after they were cured. HAMD score was equal to or higher than 20 with reference to the diagnosis standard for depression as set out in CCMD-3, it meant that the depression recurred.

Cognitive function evaluated by the follow-up study

A follow-up study of all the cured patients of the two groups was conducted for 3 months and Minimum Mental State Examination (MMSE) was adopted to assess their cognitive functions at 3 months after they were cured. MMSE is a screening tool currently widely used to check and diagnose cognitive defects and it score ranges from 0 to 30. A higher score means a better cognitive function.

Table 2. Comparison of HAMD scores and clinical effects before and after treatment ($\bar{x}\pm s$)

Group	Male/ Female	HAMD evaluation (score)					
		Before treatment			After treatment		
Control group	20/20	28.92±4.20			15.87±2.41		
Observation group	20/20	29.31±4.25			16.25±2.38		
Group	Male/ Female	Clinical effect (number)					
		Cured	Obvious effective	Effective	Ineffective	Obviously effective rate	Total effective rate
Control group	20/20	29	5	6	0	85.00%	100.00%
Observation group	20/20	27	6	6	1	82.50%	97.50%

Note: Inter-group comparison after treatment, $P>0.05$.

Table 3. Comparison of cure rates and recurrence rates ($\bar{x}\pm s$)

Group	Male/ Female	Cure rate during after 3 courses of treatment		Recurrence rate within 3 months	
		Cured	Cure rate (%)	Recurrences	Recurrence rate (%)
Control group	20/20	29	72.50	7	24.14
Observation group	20/20	27	67.50	2	7.41*

Note: *$P<0.05$, *vs*. Control group.

Table 4. Comparison of HAMD and MMSE scores at 3 months after the patients were cured ($\bar{x}\pm s$)

Group	Number	HAMD assessment (score)	MMSE assessment (score)
Control group	29	17.49±2.41	20.16±3.60
Observation group	27	15.60±2.38[a]	23.05±3.15[b]

Note: [a]$P<0.05$ *vs*. Control group; [b]$P<0.05$ *vs*. Control group.

Quality of life evaluated by the follow-up study

The quality of life of the cured patients of the two groups was assessed by adopting the Generic Quality of Life Inventory-74 (GQOLI-74) and the assessment was conducted before the treatment and after the end of each course of treatment, including four dimensions of the physical function, mental function, social function, and material living conditions, with the former three dimensions containing 5 factors and the last dimension containing 4 factors. There were 20 factors in total, including a factor of general quality of life. A higher score means a better quality of life.

Statistical treatment

The statistical software package in SPSS 17.0 was used to compare the data for treatment effect and the data derived from the follow-up study at 3 months after the patients were cured. The data are reflected by ($\bar{x}\pm s$), and t-test was adopted for comparing measurement data, while χ^2 test was used for comparing enumeration data. $P<0.05$ means that the difference had statistical significance.

Result

During treatment, no significant difference was shown between the two groups

Table 2 showed that, when the two groups were given the same combined treatment for 3 courses, 29 patients in the control group were cured, while in the observation group, the number of cured patients was 27, meaning that there was no obvious difference between the two groups in terms of the obvious and total effective rates and post-treatment HAMD scores, $P>0.05$ in both cases.

Three months following the study, after they were cured, the observation group had a higher recurrence rate

Twenty-nine patients in the Control Group were cured, while 27 patients in the Observation Group were cured. Only the patients of the groups who were cured were followed up. According to **Table 3**, Of the 29 patients in the Control Group who were cured, our follow-up study for 3 months shows that there were 7 recurrences, accounting for 24.14% of such patients. Of the

Table 5. Comparison of GQOLI-74 scores at 3 months after the patients were cured ($\bar{x}\pm s$)

Group	Number	Physical function (score)	Mental function (score)	Social function (score)	Material life (score)	General life quality (score)
Control group	29	70.14±5.29	69.32±6.70	74.91±5.46	73.61±5.72	72.71±5.49
Observation group	27	78.02±6.04*	74.84±6.39*	77.25±6.22*	75.04±6.11	76.45±6.10*

Note: *P<0.05 *vs*. Control group.

27 patients in the Observation Group who were cured, our follow-up study for 3 months shows that there were 2 recurrences, accounting for 7.41% of such patients. This meant that the recurrence rate of the observation group was obviously lower that of the control group (P< 0.05).

Three months following study, after they were cured, cognitive function of the observation group was better than the control group

According to **Table 4**, follow-up study at 3 months after the patients were cured showed that compared with the observation group, the HAMD scores of the control group was obviously higher (P<0.05), but its MMSE scores were obviously lower (P<0.05), respectively.

Three months following study, after they were cured, the quality of life of the observation group was better than the control group

According to **Table 5**, the follow-up study at 3 months after the patients were cured showed that, the scores in all dimensions of GQOLI-74 assessment of the observation group were higher than those of the control group (*P<0.05), except for the dimension of material life quality which showed no significant difference (P> 0.05).

Discussion

Anti-depressant drugs cause side effects to patients. Given the hypofunction and weak physique of the elderly people, the side effect of long-term oral drugs will bring secondary damage to their physical and mental health. Therefore, an alternative physiotherapy is more acceptable to the patients. Among all these physiotherapies, the treatment effect of kinesitherapy has caused the attention of the researchers who believe that its effect can be as good as that of the drugs [7, 8]. Furthermore, it is easy to operate and has no cost, able to adjust the psychology and build the human body. For example, some relevant reports [9-11] have proved that, kinesitherapy can not only strengthen the regulating function of human body, but also produce obviously conducive effect on the psychological and autonomic nervous functions of the patients. So, it not only helps improve the patients' mood to increase their ability for communication, but also enhances the regulating function of the nerve system to promote nerve regeneration, which in turn greatly improves the general situation of patient with depression. According to other reports [12, 13], depression is closely linked with the support of the society and participation of the patients into the collective activities. If the patients join certain societies or groups according to their habits and get relaxed by communicating more with other people, their state of illness will be greatly improved.

Given that elderly patients are not suitable for long-term oral drugs and based on the explanation of the said principle of kinesitherapy, this study selected fitness exercise, a currently popular exercise, as an intervention treatment on the basis of the oral drugs. During the 1-3 courses of treatment, the cured patients in the control group timely stopped the drugs as well as the fitness exercise, while the cured patients continued such exercises. A follow-up study was conducted to compare such physical and mental health indicators of the cured patients of the two groups as the recurrence rate so as to observe the consolidation effect of long-term fitness exercise. The results of this study showed that, after the 3 courses of treatment, the cure rate of the two groups were 72.5% and 67.5% respectively and the treatment effect was clear. The 3-month follow-up study of the patients and the comparison of the recurrence rates of the two groups showed that the recurrence rate of the observation group was 7.41%, which was lower than that of the control group which was 24.14%, P<0.05. Furthermore, the indicators of the observation group on their life quality, physical and mental functions, mental

state and cognitive functions were better than those of the control group, $P<0.05$. The reason for this, in the final analysis, is connected with the continuous intervention of fitness exercise of the observation group. Square dance as a fitness exercise is a kind of collective dance with simple and lively rhythm and relaxing actions, combining entertainment and performance and focused on recreation. It is so named because the dancers often gather and dance at the square and most of the participants are elderly people. So, it is likely to be accepted, implemented, and promoted among the elder patients. While dancing elegantly with beautiful music, the participants feel happy, this is conducive to blunting fatigue, cultivating their mind, and positively regulating their mental state. It helps nurture an open and optimistic disposition, which is an important factor to avoid depression [14, 15]. In addition, the elderly often pay special attention to their own physical health, while long-term fitness exercise like the square dance can accelerate their metabolism and exercise their cardiovascular and respiratory systems so that their health and mobility are improved. After exercise for a long time, the elderly people will eat more, sleep better, feel well, and become invigorated, which will greatly reduce their psychological burden and help prevent depression.

In summary, this study suggests that, after the elder patients stop taking drugs, they should be guided to continue to participate in such recreational collective physical fitness exercise like square dancing, because, during the dance, they will feel entertained and relaxed both physically and mentally and their psychological health will be gradually and positively influenced. This is conducive to consolidate the effect of the treatment in the prior stage and avoid the recurrence of their depression. Therefore, whether the patients are cured or not, they should participate in long-term exercise. It is suggested that the patient use such exercises as square dance as a means for their daily fitness routine.

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Disclosure of conflict of interest

None.

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