

# EFFECT OF EXERCISE INTERVENTION AND REHABILITATION ON PATIENTS WITH DEPRESSION



ORIGINAL ARTICLE  
ARTIGO ORIGINAL  
ARTÍCULO ORIGINAL

EFEITO DA INTERVENÇÃO DO EXERCÍCIO E REABILITAÇÃO EM PACIENTES COM DEPRESSÃO

EFFECTO DE LA INTERVENCIÓN DEL EJERCICIO Y REHABILITACIÓN EN PACIENTES CON DEPRESIÓN

Yang Shen<sup>1</sup>   
(Physical Education Professional)

1. Chifeng University, Chifeng,  
Inner Mongolia, China.

## Correspondence:

Yang Shen  
Inner Mongolia, China, 024000,  
syang1112@163.com

## ABSTRACT

*Introduction: The increase in the number of students experiencing depression severely impacts the physical and mental health of college students. Objective: Explore the effect of an exercise intervention on patients with depression by analyzing its rehabilitation effect. Methods: Physical education combined with extracurricular activities were chosen. The experimental physical education group completed about 45 minutes of low-intensity running, performing physical recovery and rest under teacher guidance. The sport form of extracurricular activity was basketball, twice a week. Physical education combined with extracurricular activities totaled a total of 4 times a week, lasting six weeks. Results: The exercise intervention reduced the participants' psychological test scores, relieving them of their psychological conditions. The exercise intervention improved somatization factors (obsessive-compulsive, depression, interpersonal, paranoid, anxiety, and negative symptoms). Conclusion: The personalized exercise plan is recommended for students with depression, with the promotion of corresponding physical exercise out of class, aiming to improve students' psychological state and mental health. **Level of evidence II; Therapeutic studies - investigation of treatment outcomes.***

**Keywords:** Depression; Exercise Therapy; Rehabilitation.

## RESUMO

*Introdução: O aumento no número de estudantes que sofrem depressão tem um impacto negativo severo na saúde física e mental dos estudantes universitários. Objetivo: Explorar o efeito da intervenção do exercício em pacientes com depressão, analisando o seu efeito de reabilitação. Métodos: Elegeram-se a forma de educação física combinada com atividades extracurriculares. O grupo experimental de educação física completou cerca de 45 minutos de corrida de baixa intensidade, realizando a recuperação física e o descanso sob orientação dos professores. A forma esportiva de atividades extracurriculares foi o basquete, duas vezes por semana. A educação física combinada com as atividades extracurriculares totalizou um total de 4 vezes semanais, com duração total de seis semanas. Resultados: A intervenção no exercício teve efeito redutor nos escores do teste psicológico dos participantes, revelando um alívio de suas condições psicológicas. A intervenção no exercício apresentou efeitos evidentes sobre a melhoria dos fatores de somatização (sintomas obsessivo-compulsivos, depressão, interpessoais, paranoicos, de ansiedade e hostis). Conclusão: O plano de exercício personalizado é recomendado para os alunos com depressão, sendo a promoção do exercício físico correspondente extraclasse, visando melhorar o estado psicológico dos alunos e melhorar sua saúde mental. **Nível de evidência II; Estudos terapêuticos - investigação dos resultados do tratamento.***

**Descritores:** Depressão; Terapia por Exercício; Reabilitação.

## RESUMEN

*Introducción: El aumento del número de estudiantes que sufren depresión tiene un grave impacto negativo en la salud física y mental de los universitarios. Objetivo: Explorar el efecto de la intervención de ejercicio en pacientes con depresión analizando su efecto de rehabilitación. Métodos: Se eligió la forma de educación física combinada con actividades extraescolares. El grupo experimental de educación física realizó unos 45 minutos de carrera de baja intensidad, realizando recuperación física y descanso bajo la dirección de los profesores. La forma deportiva de las actividades extracurriculares era el baloncesto, dos veces por semana. La educación física combinada con las actividades extraescolares se realizaba un total de 4 veces por semana, con una duración total de seis semanas. Resultados: La intervención de ejercicio tuvo un efecto reductor en las puntuaciones de las pruebas psicológicas de los participantes, revelando un alivio de sus condiciones psicológicas. La intervención del ejercicio mostró efectos evidentes en la mejora de los factores de somatización (síntomas obsesivo-compulsivos, de depresión, interpersonales, paranoides, de ansiedad y hostiles). Conclusión: Se recomienda el plan de ejercicio personalizado para los alumnos con depresión, con la promoción del correspondiente ejercicio físico extra clase dirigido a mejorar el estado psicológico de los alumnos y a mejorar su salud mental. **Nivel de evidencia II; Estudios terapéuticos - investigación de los resultados del tratamiento.***

**Descriptor:** Depresión; Terapia por Ejercicio; Reabilitación.



## INTRODUCTION

With the increasing attention to depression, depression has become a mental health problem of common concern to modern people. As one of the main mental diseases in the world, depression has attracted more and more attention.<sup>1</sup> At this stage, the number of students suffering from depression is increasing, which has a serious negative impact on the physical and mental health of college students. Under the influence of personal factors and economic factors, college students suffering from depression are difficult to obtain effective treatment. Although some use traditional medicine and psychological treatment, the effect is not obvious, which brings a heavy burden to the society and family.<sup>2</sup>

This paper tests the effect of exercise on cognitive function by measuring the reaction time of patients with depression performing various cognitive tasks. The results showed that by participating in exercise, the response time of patients with depression to target cognitive tasks decreased significantly. Literature studies have found that exercise can improve episodic memory in patients with depression, and episodic memory is closely related to hippocampal function. This paper studies the function and rehabilitation effect of exercise intervention in patients with depression, and discusses the application of exercise intervention in the field of depression treatment, so as to alleviate various factors of depressed college students, so as to improve work efficiency and reduce bad psychology, so as to provide some help for mental health education in Colleges and universities.<sup>3</sup>

## METHOD

Firstly, this paper applies the literature research method to sort out and collect the data on depression, exercise intervention, the methods of exercise intervention, the identification of depression rehabilitation and the judgment index factors of depression, so as to have a further understanding of the research content and lay the theoretical foundation of this paper. Then, using the experimental method, 36 students with certain psychological problems and identified as depression in a university were selected and divided into two groups, with 18 in each group. The study and all the participants were reviewed and approved by Ethics Committee of Chifeng University, (NO. 2019C201).

Because the schoolwork burden of college students is relatively busy, this paper selects the form of physical education combined with extracurricular activities. The physical education class is 45 minutes long. In this stage, the experimental group carries out relevant endurance running activities under the guidance of teachers, completes about 45 minutes of running with low exercise intensity, and carries out full physical recovery and rest under the guidance of teachers. The sports form of extracurricular activities is basketball, which is interesting and challenging. Accompanied by some volunteers, the experimental group of depressed students completed one hour of basketball twice a week. Physical education combined with extracurricular activities is four times a week for six weeks. The control group has little difference from the experimental group in daily life courses. The physical education class chooses the cultural courses based on theory and does not carry out extracurricular basketball activities. The data of the experimental group and the control group were recorded before the experiment, and the same test was carried out after the experiment. The relevant data were recorded and analyzed.

In order to reflect the rehabilitation effect of exercise intervention on depressed college students and its impact on their daily life and work, this paper selects working memory as a judgment index, adopts n-back paradigm, designs a series of stimulating raw materials, which are gradually distinguished by the subjects, and finally determines whether the N stimulating raw materials are consistent with the identification of the subjects.

## RESULTS

### Effect analysis of exercise intervention based on symptom checklist 90

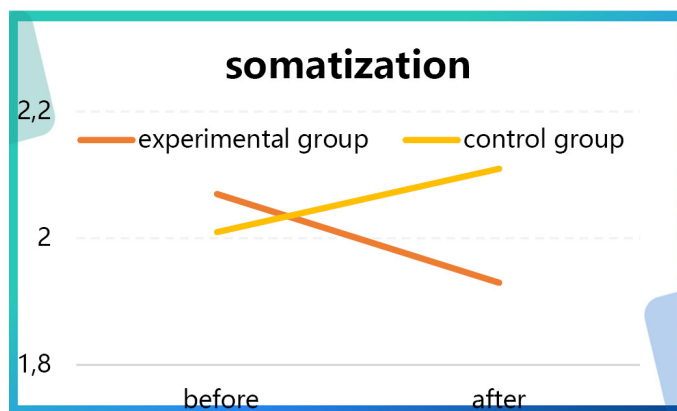
In order to have a more intuitive understanding of the effect of exercise intervention on depressed students, this paper compares the psychological test scores of participants before and after exercise intervention, including the changes of total scores and some factors, as shown in this section.

Table 1 shows the comparison of the average scores of participants' psychological tests before, during and after the exercise intervention. The scale used is symptom Checklist-90. It can be seen from the table 1 that the average score of the experimental group decreased significantly from 193.840 before the intervention to 171.639 after the intervention, and the average score of the control group increased from 206.800 before the intervention to 208.452 after the intervention. In the comparison between groups, there was no significant difference before the intervention ( $P > 0.05$ ), After the intervention, the p value between the experimental group and the control group is less than 0.01, indicating that there is a very significant difference, which proves that if patients with depression do not receive timely treatment, their psychological test scores will increase slowly, while exercise intervention can reduce the psychological test scores of participants to a certain extent, which can alleviate their psychological situation. But on the whole, both before and after the intervention, the average psychological test scores of the two groups are higher than 160, which shows that exercise intervention cannot be used as an independent treatment to regulate the problem of depression, but only as an auxiliary of medical and psychological means.

Figure 1 shows the intervention effect of somatization factors before and after the intervention. Somatization factors refer to physical feelings. For example, patients believe that they have problems such as low back pain, poor breathing, abnormal heart jumping frequency, chest tightness and asthma, dyspepsia, dizziness and inexplicable pain, which is also a response to psychological problems. As can be seen from Figure 1, the experimental group showed an obvious downward trend before and after the intervention, from more than 2 points to less than 2 points, while the control group showed a slow upward trend, which was always greater than 2 points. As the watershed of individual scores in

**Table 1.** Comparison of average psychological test scores of participants before, during and after exercise intervention.

Test	Group	Average score	F	P
Before intervention	test group	193.840	0.979	0.3142
	Control group	206.800		
After intervention	test group	171.639	12.265	0.0009
	Control group	208.452		



**Figure 1.** Intervention effect of somatization factors before and after intervention.

the evaluation of the scale, score 2 is the critical point to judge whether psychological intervention is needed. It can be seen from Figure 2 that with the development of sports intervention, the score of somatization factors gradually decreases and has been greatly improved. If the development of intervention is not carried out, the score will increase slowly. Therefore, exercise intervention has a significant effect on the improvement of patients' somatization factors ( $P < 0.05$ ).

Figure 2 shows the intervention effect of obsessive-compulsive symptom factors before and after the intervention. Obsessive-compulsive symptoms are similar to the obsessive-compulsive disorder often mentioned, which means that patients understand that this behavior is useless, but they can't control the relevant behavior. In some cases, cognitive impairment can also produce obsessive-compulsive symptoms. As can be seen in Figure 2, before and after the intervention, the score of the control group is almost unchanged, and the value is greater than 2. The score of the experimental group before the intervention is high, which is significantly reduced after the experiment. Although it is still greater than 2, it also proves that the relevant exercise intervention can significantly improve the factors of obsessive-compulsive symptoms of patients ( $P < 0.05$ ).

Figure 3 shows the intervention effect of depressive factors before and after the intervention. In short, depressive factors are that the patient's mood is always maintained in a depressed state, and he has lost interest in everything around him, lacks the motivation of life, lacks curiosity about external things, and the whole person is always in a disappointed and pessimistic environment. If this factor continues to deteriorate, it is easy to have the idea of world weariness and suicide, which will lead to suicide and other behaviors. It can be seen from Figure 3 that although the control group decreased slightly before and after the intervention, it remained above 2 and was still in a relatively serious state. The score of

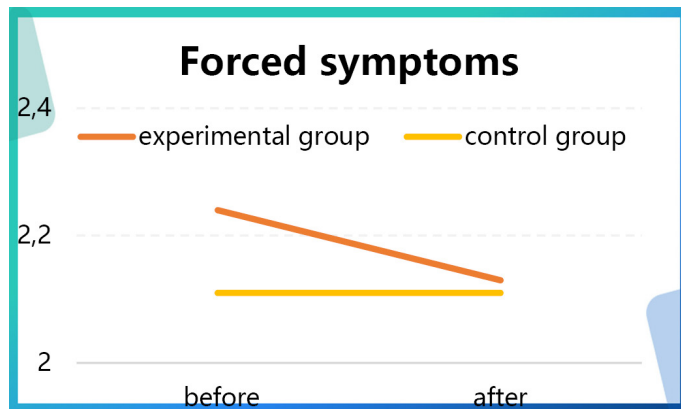


Figure 2. Intervention effect of obsessive-compulsive symptom factors before and after intervention.

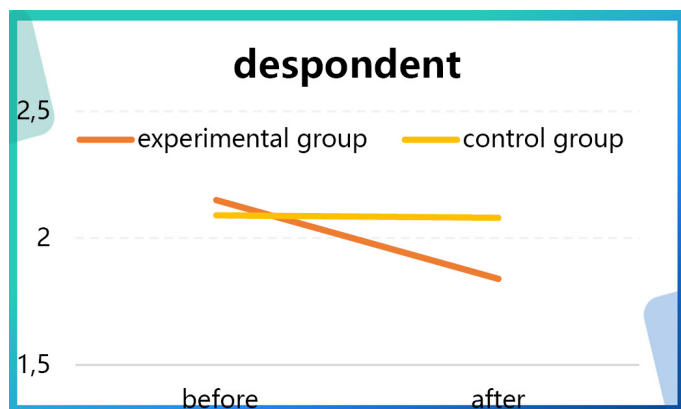


Figure 3. Intervention effect of depression factors before and after intervention.

the experimental group decreased from more than 2 to less than 1.85, indicating that there was a very significant improvement effect. Therefore, the relevant exercise intervention had a significant improvement effect on the depressive factors of patients ( $P < 0.05$ ). Sports can better awaken the yearning and vitality of depression patients to life, so as to reduce their suicidal and world weary tendency.

As shown in Figure 4, the intervention effect of interpersonal factors before and after the intervention is shown. Interpersonal factors are the patient's attitude towards communicating with others in daily life, perceived self-awareness, etc. patients with depression often have obvious inferiority complex in the process of interpersonal communication. When communicating with others, they often feel uncomfortable and think that the other party despises themselves, There are some uneasy problems and so on. When this emotion is serious, they will subjectively think that the other party doesn't want to see themselves, misinterpret the other party's expression, and deliberately avoid interpersonal communication. It can be seen from Figure 4 that the experimental group and the control group have improved to a certain extent before and after the intervention, and the improvement effect of the experimental group is better than that of the control group, which proves the effectiveness of exercise intervention ( $P < 0.05$ ).

### Analysis of rehabilitation effect of daily life of patients with depression

In order to explore the impact of exercise intervention on the daily life of patients with depression, the common working memory in college students' life and work was selected as the judgment index to analyze the impact of the improvement of depression on the subjects' work, as follows.

As shown in Table 2, during the 1-back reaction, the experimental group decreased significantly from (902.550 ± 342.031) ms before intervention to (757.310 ± 263.467) ms after intervention, and the control group decreased slightly from (869.941 ± 351.656) ms before intervention to (855.628 ± 342.972) ms after intervention, But the range is not high, which shows that exercise intervention can improve the subjects' 1-back working memory. In the measurement of 2-back reaction time,

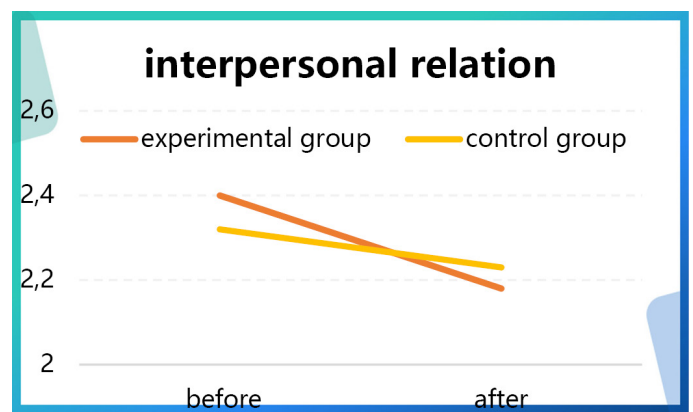


Figure 4. Intervention effect of interpersonal relationship factors before and after intervention.

Table 2. Analysis of changes in working memory of subjects before and after exercise intervention.

Test	Group	1-back reaction time (ms)	2-back reaction time (ms)
Before	Test	902.550 ± 342.031	1103.035 ± 221.016
	Control	869.941 ± 351.656	1055.759 ± 163.604
After	Test	757.310 ± 263.467	874.152 ± 222.171
	Control	855.628 ± 342.972	1169.144 ± 175.926
F		2.720	29.829

the experimental group obtained a significant decrease from (1103.035 ± 221.016) ms before intervention to (874.152 ± 222.171) ms after intervention, indicating that the reaction efficiency was improved. In the control group, there was a certain increase from (1055.759 ± 163.604) ms before intervention to (1169.144 ± 175.926) ms after intervention, which proved that the reaction time became longer and the reaction ability decreased. Overall, exercise intervention also has an excellent effect on improving 2-back reaction time. In general, exercise intervention has a good effect on working memory and daily rehabilitation of patients with depression. It can reduce the reaction time of patients, improve their reaction efficiency, and play a certain role in daily life, study and work.

## DISCUSSION

The formulation and implementation of exercise intervention plan should improve the physical and mental function of participants or athletes. Through consulting a large number of literature, we can see that physical exercise intervention plays a positive role in the improvement of psychological problems, but different sports intervention has different effects and levels on various psychological problems.<sup>4</sup> This requires that when making exercise intervention plans for students with depression: first, the design structure should be scientific and reasonable, and there should be rules for exercise items, exercise intensity and exercise frequency; Secondly, the exercise intensity should be selected according to the physical fitness index data of subjects in the previous stage; Finally, the selection of sports should be based on the psychological problems of depressed students, and the practice time must be adjusted according to the actual situation of schools and students.<sup>5</sup>

Because the psychological problems are multidimensional and not single, the design of this exercise intervention plan combines a variety of sports, formulates a comprehensive exercise plan according to the characteristics of high multi factor scores of depressed students, and divides the overall exercise process into start, preparation, basic, result and so on. At the same time, according to the results of literature analysis, it can be seen that different sports have different intervention effects on different psychological problems. Therefore, it is necessary to compare the sports intervention items with the actual psychological problems when formulating the intervention plan. We should not only pay attention to the overall development, but also be targeted to balance

the relevance and overall complexity of exercise plan design, so as to design an effective exercise intervention plan.<sup>6</sup>

In view of the fact that the subjects of this study are students with depression, before formulating the sports intervention plan, first of all, if the subjects of the study are ordinary colleges and universities, rather than sports or art colleges and universities, we need to fully consider the students' physiological and psychological factors; Secondly, it is necessary to judge whether the subjects in the experimental group can complete the exercise intensity set by the experiment in combination with the physical index test results of the subjects in the experimental group; Finally, we need to consider the particularity of students with depression. Therefore, when designing the exercise intensity intervention program for depressed students, this study takes the medium intensity training items as the main content, that is, set the maximum heart rate as "150 beats / min" and the minimum heart rate as "100 beats / min". Before and after exercise, low-intensity warm-up stretching and respiratory regulation exercise should be carried out, and the principle of low medium low heart rate should be followed step by step to ensure the improvement of subjects' physical adaptability and experimental safety.

## CONCLUSION

From the experimental study in this paper, it can be seen that exercise intervention can significantly improve patients with depression, effectively alleviate their somatization discomfort, improve obsessive-compulsive symptoms, promote interpersonal communication, reduce their suicidal and world-weary tendencies, etc. However, from the overall score, it can be seen that the score of patients before and after exercise intervention is still more than 160 points, Therefore, exercise intervention cannot be used as a separate way to treat patients with depression, but must be combined with other ways as a good auxiliary means. Psychological teachers in colleges and universities should also cooperate with physical education teachers to customize relevant sports plans for depressed students and promote them to carry out corresponding physical exercise inside and outside the classroom, so as to improve students' psychological state and improve college students' mental health level in many aspects.

---

The author declare no potential conflict of interest related to this article

---

---

**AUTHORS' CONTRIBUTIONS:** Every author has made an important contribution to this manuscript. YS: writing and execution.

---

## REFERENCES

1. Creswell JD, Lindsay EK, Villalba DK, Chin B. Mindfulness training and physical health: mechanisms and outcomes. *Psychosom Med.* 2019;81(3):224-32.
2. Zeng W, Chen R, Wang X, Zhang Q, Deng W. Prevalence of mental health problems among medical students in China: A meta-analysis. *Medicine (Baltimore).* 2019;98(18):e15337.
3. Yao B. On the Influence of Sports Activities on Mental Health of College Students. *Bulletin of Sport Science & Technology.* 2016;57(9):772-93.
4. Firth J, Solmi M, Wootton RE, Vancampfort D, Schuch FB, Hoare E, et al. A meta-review of "lifestyle psychiatry": the role of exercise, smoking, diet and sleep in the prevention and treatment of mental disorders. *World Psychiatry.* 2020;19(3):360-80.
5. Branković E. Sports, mental health, and the dilemmas of fame and success: In a search of a holistic paradigm. *Pannoniana: Časopis za humanističke znanosti.* 2020;4(1):9-33.
6. Martland R, Mondelli V, Gaughran F, Stubbs B. Can high-intensity interval training improve physical and mental health outcomes? A meta-review of 33 systematic reviews across the lifespan. *J Sports Sci.* 2020;38(4):430-69.