

THE INFLUENCE OF FOOTBALL EXERCISE ON THE REHABILITATION OF CHINESE COLLEGE STUDENTS WITH MENTAL ILLNESS

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SUMMARY

Introduction: With the development of society, people's life quality is gradually improved, which leads to increased social competition pressure. Meanwhile, undergraduate students are facing great pressure and serious mental health problems. Some college students' mental illness can be effectively treated by sports, which has been widely recognized by society. From the perspective of football, this study analyzes the specific impacts of football on the rehabilitation of college students' mental illnesses.

Subjects and methods: This paper selects students from a university in Liaoning Province, China as the research subjects. The subjects are randomly divided into two groups. The experimental group is given relaxation therapy, supplemented with football exercise. The control group is only given relaxation therapy. The SCL-90 scores of each group are re-tested every ten days. The paper adopts correlation analysis, variance analysis, regression analysis, and other research methods.

Results: Relaxation therapy positively affects the rehabilitation of college students' mental illness. Supplemented with football exercise, the rehabilitation effect is significantly improved. On the last time of the test, the arithmetic mean of SCL-90 scores in the experimental group is 162.42, which reaches the normal level. The results of the sample t-test show that the SCL-90 scores of the experimental group and the control group are significantly different at the level of 0.01 ($t = -3.933$, $P = 0.008 < 0.01$).

Conclusions: Football exercise has an important impact on the rehabilitation of patients with mental illness. The causes of mental illness among college students are complex. To alleviate this problem, schools and all sectors of society shall take relevant measures to play their guiding roles in this regard.

Key words: football exercise – sports - mental illness - college students – rehabilitation

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INTRODUCTION

With the development of society, the eastern and western cultures converge and collide. The market is becoming more competitive, and the big era is coming with profound changes in ideas and lifestyles. Under the background and the joint effects of external and internal factors, college students' psychological development is facing various uncertainties. In addition, most contemporary college students are the only child in their families, with strong self-awareness, diversified thoughts, as well as complex and wayward reactions to external influences. Therefore, academics, employment, interpersonal communication, love, and family pressure may all become the main factors that induce mental illness among college students (Sabourin et al. 2019). According to a survey by the World Health Organization, a quarter of college students in China admit that they have suffered from mental illnesses including depression. Therefore, it is particularly important to prevent and intervene in mental illness among college students (Yang et al. 2018).

Existing psychological experiments show that the information between the human brain and muscles is bidirectionally transmitted. Nerve excitation can be transmitted from brain to muscles, and from muscles to brain. When the human body is active, the motor system transmits impulses to the central brain, affecting the excitability of the brain, thereby controlling emotional changes. The more activities there are in the motor

system, the more nerve excitation it transmits, and the emotion will be soaring (Wu et al. 2015). Otherwise, the emotion will be down. People's emotions can be effectively adjusted by physical exercises. (Ramzi & Besharat 2010). Psychologist Chen Zhonggeng reckons that social support and sports are the two most prominent factors, factors that have been found to reduce the incidence of psychological stress in an individual's life. Compared with people who are accustomed to sitting, people who exercise regularly have fewer physical stress responses. If there is any, he or she can recover from it as soon as possible (Zhou et al. 2021). A study from The Lancet also points out that compared with people who do not exercise, people who exercise regularly have less psychological stress and are less likely to become depressed. Among various sports, the team sport, like football, is the most effective way in reducing psychological stress, the second is cycling, and the third is cardio or gym exercise (Chekroud et al. 2018).

Football is a form of sport with a strong collective nature. In the whole process of the game, all players participate in the sport, with common interests and goals. Only through effective cooperation among all players, can they win the game. (Sullivan et al. 2019). The success of a team is directly related to all players, which can cultivate students' sense of teamwork, responsibility, and competition. The basic characteristics of football are as follows. The exercise

intensity is high. Players need to move fast, their whole body is in a high degree of excitement, and their muscles will contract faster. And during the exercise, the brain can enhance nerve impulses, promote the secretion of dopamine in the body to make people feel happy and emotional. Therefore, football has a remarkable effect on the regulation of psychological disorders and the alleviation of mental illness (Eganov et al. 2018). At present, the impact of football on college students' mental illness still lacks research through experimental comparison and mathematical statistics, not specific and standardized. This paper, based on statistical tools, studies the relationship between mental health and football with the use of correlation analysis, variance analysis, regression analysis, and other methods.

SUBJECTS AND METHODS

Research object

This paper selects students from a university in Liaoning Province as the research subjects. The study is carried out through online questionnaires. A total of 2,000 questionnaires are distributed, and 1,850 questionnaires are collected. Among those, 1,705 valid questionnaires are obtained, with an effective rate of 92.2%, excluding those whose answer time is less than 150 seconds and whose option similarity is more than 80%. All the students surveyed are informed and consented to the research background, research plan, questionnaire content, and other information.

Research tools

This study uses the Questionnaire Star to conduct an online questionnaire survey. The SCL-90 is used to test the psychological status of subjects, and SPSS26.0 is used for data analysis.

The SCL-90, also known as the Symptom Self-Rating Scale or Hopkin's Symptom Checklist, is compiled in 1975 by L.R. Derogatis. The scale comprises a wide range of psychiatric symptoms, a total of 90 items, including feeling, emotion, thought, consciousness, behavior, living habits, interpersonal relationships, diet, sleep, etc. 10 factors in this scale is used to reflect 10 aspects of psychological symptoms. According to the national norm results, if the total score of SCL-90 exceeds 160, the number of positive items exceeds 43, or any factor score exceeds 2, further examination is required.

Research proposal

In statistics and analysis, this study selects research subjects whose two or more factors with scores greater than 3 and a total score greater than 220 in the questionnaire. A total of 56 subjects are randomly divided into two groups, including 28 subjects in the experimental group and 28 in the control group. The experimental group is given relaxation therapy, supplemented with football. The control group is only given relaxation therapy. SCL-90 scores of each group are re-tested every ten days, and data is recorded and analyzed.

RESULTS

The scores of ten factors, including somatization, compulsion, interpersonal relationship, depression, anxiety, hostility, terror, paranoia, psychosis, and additional factors, are counted among students who participated in the questionnaire survey. Factor items with a score greater than 2 are selected, counted, and recorded. The overall distribution of factors is shown in Figure 1.

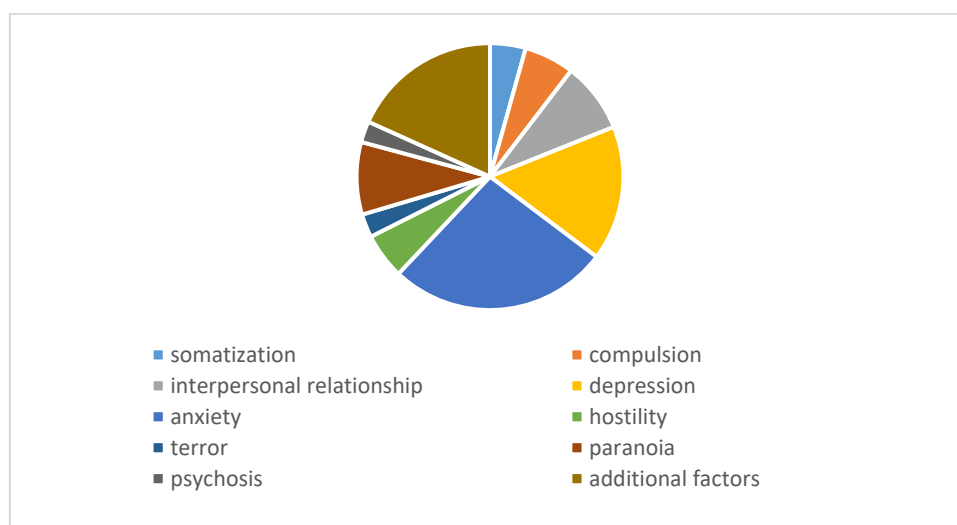


Figure 1. SCL-90 factor distribution

A single factor with a score greater than 2 indicates that there may exist mental illness, and further analysis

is required. According to Figure 1, among the single factors with a score greater than 2, anxiety, depression

and additional factors account for far more than other items. Anxiety refers to the unpleasant and complex emotional states, such as tension, anxiety, worry, annoyance, etc., which may result from an individual when he or she faces an imminent and possible danger or threat (Christy 2021). Nowadays, depression is the most common mental illness, with continuous and long-term low mood as the main clinical feature. Other symptoms include slow thinking, decreased volitional activity, cognitive impairment, and somatic symptoms (Dalky & Gharaibeh 2019). Additional factors mainly reflect the sleep and diet condition of subjects. Symptoms such as anxiety and depression may affect subjects' sleep quality. Anxiety, depression, and additional factors are the three main mental illnesses of current college students. The three main items are interrelated and cross-influenced, which is consistent with current research results at home and abroad

(Karatekin 2018).

Individuals whose two or more factors with scores greater than 3 and a total score greater than 220 in the questionnaire are selected as research subjects. 56 subjects are finally screened, including 30 males and 26 females, and are randomly divided into two groups, with 28 subjects in the experimental group and 28 in the control group.

The experimental group is given relaxation therapy, supplemented with football exercise, 30-60 minutes per day and 3-5 times per week. The control group is only given relaxation therapy. The SCL-90 scores of each group are retested every ten days, and data is recorded seven times a total.

In this experiment, $n_1=n_2=28$. According to the Grubbs criterion, the original data is sorted and the abnormal data is eliminated. The arithmetic mean of each group is shown in Table 1.

Table 1. The arithmetic mean of SCL-90 scores

	1st time	2nd time	3rd time	4th time	5th time	6th time	7th time
Experimental group	236.15	230.49	210.56	198.22	176.01	165.12	162.42
Control group	238.88	235.59	230.46	221.39	214.99	208.18	201.45

SPSS26.0 is used to perform statistical analysis on the data of each group. The results of the one-way ANOVA test from the control group and the

experimental group in the 1st test (without relaxation therapy or physical therapy) are shown in Table 2.

Table 2. One-way ANOVA test of control group & experimental group

	Sum of squares	df	Mean Square	F	Sig.
Between groups	2.474	1	2.474	1.286	0.262
Within groups	103.886	54	1.924	-	-
Total	106.359	55	-	-	-

According to the *F* test data in Table 2, in the 1st test, there is no significant difference in SCL-90 scores between the experimental group and the control group ($F = 1.286, P = 0.262 > 0.05$), which was in line with the experimental expectation. Linear analysis is performed on the 7th test data between the experimental group and the control group, respectively. The fitting degree analysis of the two groups is shown in Table 3 and Table 4.

According to Table 3 and Table 4, $R_1^2=0.971$, $DW_1=1.954$, the linear fitting degree of the experimental group's data to the time variable is good.

$R_2^2=0.990$, $DW_2=1.570$, the linear fitting degree of the control group data to the time variable is good. SPSS26.0 is used to linearly fit the data of two groups respectively. The *t*-test is performed on paired samples. The results are shown in Table 5.

According to the *t*-test results of paired samples, the SCL-90 scores of the two groups are significantly different at the level of 0.01 ($t = -3.933, P = 0.008 < 0.01$). According to the SPSS fitting results, $B_1=-13.803$, $B_2=-6.521$, the SCL-90 scores of the experimental group decreased significantly.

Table 3. Experimental group model data

	R	R square	Adjusted R square	Std. error of the estimate	Durbin-watson
Value	0.986	0.971	0.966	5.61831	1.954

Table 4. Control group model data

	R	R square	Adjusted R square	Std. error of the estimate	Durbin-watson
Value	0.995	0.990	0.988	1.55638	1.570

Table 5. Paired sample *t*-test between the experimental group and the control group

	Mean	Std. Deviation	Std. Error Mean	95% CI		<i>t</i>	Sig. (2-tailed)
				Lower	Upper		
Value	-24.56714	16.52501	6.24587	-39.85023	-9.28406	-3.933	0.008

CONCLUSION

According to the above research, anxiety and depression, and additional factors are three main mental illnesses that current college students are facing (Tahara et al. 2021). Relaxation therapy has a certain positive effect on treating college students' mental illness, but the therapeutic effect is limited. Therefore, only relying on this way can merely improve the status quo to some extent, while the mean score of SCL-90 among college students remains at a high level. By contrast, the therapeutic effect supplemented with football exercise can be improved significantly. According to the data, the therapeutic effect of 30-day relaxation supplemented with football exercise exceeds the effect of 60-day relaxation therapy only. Based on the results of variance and regression analysis as well as the questionnaire survey of students' daily status, it can be seen that football exercise has an important positive impact on people's mental health. It also has a significant effect to maintain mental health and to deal with psychological disorders from the perspectives of attitudes, behaviors, and skills (Gaiotto et al. 2021).

Due to the limitation on time and conditions, this study also has some shortcomings. For example, the SCL-90 scale measures a person's symptom in a certain period, which reflects a person's self-perceived psychological state at that time. It is easily affected by many factors, especially life events. If someone has a high score, we can only reckon that he or she may have some kind of psychological symptoms, not a mental illness or psychological disorder. The diagnosis of any mental illness or psychological disorder should take into consideration of a certain amount of time, instead of a short period (Wilkes et al. 2019). In addition, measurement errors exist especially in psychological measurement. When the subjects know that they participate in the experiment, they may be affected by the placebo effect or may develop psychological prevention. All these will affect the data collection in the Scale survey, leading to more errors (Adilay et al. 2018). Although strict data screening has been carried out in this study, relevant issues may not be avoided completely. The study hereby mentions it with hopes that other researchers can learn from the experience and avoid similar issues.

In the questionnaire survey of this study, a large number of students with mental illness are screened out, which reflects that current universities pay less attention to related problems. Therefore, to take what measures to improve the current conditions is an issue that needs the society to think over. Universities should carry out regular school-wide psychological counseling with

goals including adaptive counseling and developmental counseling. Adaptive counseling is mainly aimed at students with certain psychological and behavioral problems yet in physical and mental health. Psychological counseling should be carried out throughout the years of college students' campus life. Their physical and mental health needs constant attention, and support to help them adapt to different stages of university life and guide them to achieve self-development (Wong et al. 2021). Developmental counseling is aimed at all students, to help students improve their mental quality and their ability to adapt to the environment. Counseling should cover study, life, character cultivation, and career guidance by group counseling and individual counseling. Group counseling can take the form of psychological knowledge lectures, mental quality training activities, theme class meetings and team activities, salon dialogues, column counseling, etc. (Ma et al. 2020). In addition, Universities can also establish students' mental health files to make mental health education more targeted and effective. By doing so, universities can thoroughly understand the overall psychological status of students from the macro perspective, and accurately grasp the conditions of students with psychological disorders from the micro perspective, to track and control them to prevent accidents. The government should issue relevant policies to ensure the privacy and safety of college students with mental problems, to increase financial support and capital investment to mental hospitals and aid stations, and to provide care and assistance to college students with psychological disorders (Fu et al. 2021). Hospitals and scientific research institutes should strengthen the tracking and investigation of college students with mental illness, promote the research and development speed of drugs for mental illness, and improve the treatment techniques and methods in hospitals, to effectively help college students with mental illness to have a speedy recovery.

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