
INTERVENTION EFFECT OF LONG-DISTANCE RUNNING ON DEPRESSION OF COLLEGES STUDENTS

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Abstract

Depression is now a common mental disorder among college students. Many methods have been developed to alleviate depression, e.g. drug treatment and psychotherapy, but to no avail. This paper aims to design an effective and safe method to prevent, control and resolve depression of college students. A total of 145 college students with different degrees of depression were selected for a 2-month long-distance running experiment. The physical and psychological conditions of the subjects were measured before and after the experiment. Then, the intervention effect of long-distance running on depression was analysed based on the measured data. The results show that long-distance running significantly improves and resolves depression; regular running greatly enhances physical quality, body control and consciousness, and relieves, improves and resolves depression; most male college students are mildly depressed, and much more anxious than males on general; the same was observed among female college students. This research lays a theoretical basis for non-pharmacological treatment for depression among college students.

Key words: Long-Distance Running, College Students, Depression, Intervention Effect.

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INTRODUCTION

With the advancement of social material civilization, the competitive pressures of work, study and life has been increased, which makes the depression a common emotional and psychological disease in today's society (Nielsen & Lyberg, 2004). The depression is mainly manifested as negative depression, accompanied by slow thinking, decreased interest in daily activities or learning (Fagerhol, Nielsen, Vetlesen et al., 2005). The World Health Organization predicts that "by 2020, depression will be the second leading cause of non-aging death and disability" (Mailey, Wójcicki, Motl et al., 2010). Many media reports claim that campus suicides are associated with mental illness in college students (Goossens, Lammers, Onrust et al., 2016), and one of the important reasons for

college students' suicide is major depressive disorder (Keeley, Smith, Nutting et al., 2004). Depression has caused serious harm to college students' physical and mental health (Beardslee, Brent, Weersing et al., 2013).

At present, the treatment of depression mainly includes drug treatment, and psychotherapy etc., but the treatment effect is not satisfactory, e.g., the drug has a larger side effect on the patient's body, and it often relapses after drug withdrawal (Allart-van Dam, Hosman, Hoogduin et al., 2007). Studies have shown that physical exercise is an effective way to maintain or promote mental health and eliminate mental illness (Mendelson, Leis, Perry et al., 2013). It can improve the human body's physical health and function, as well as the mood (Von Korff, Katon, Rutter et al., 2003; Vázquez, Torres, Blanco, et al., 2012). Neuropsychological experiments show that when the human body starts the state of exercise, the right hemisphere of the brain responsible for emotions will gradually become more pleasant, and the

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exerciser will enter a pleasant atmosphere, experience the pleasure of success, and finally achieve spiritual promotion. Therefore, physical exercise has also become a common method for treating mental illness and mental health at home and abroad (Committee & Lecturer, 2015). Especially, long-distance running has a unique effect in many chronic diseases such as cardiovascular disease, chronic fatigue syndrome, insomnia, and mental illness (Melo-Carrillo, Van Oudenhove, & Lopez-Avila, 2012; Moshki, Baloochi Beydokhti, & Cheravi, 2014). However, currently there has been no research report on the direct intervention of long-distance running on college students' depression and the comprehensive evaluation of their physiological function, mental state and physical quality (Sung, 2012; Ward & Brown, 2015).

Therefore, this paper attempts to study the intervention effect of long-distance running on college students' depression. Combined with the results of psychological and functional changes before and after long-distance running intervention, it analyses the characteristics, value and effect of long-distance running intervention on depression, which provides a theoretical reference for the safe, healthy and effective non-drug treatment of depression.

RESEARCH OBJECTS AND METHODS

Screening out the research objects

200 questionnaires of self-rated depression scales (SDS) were issued to the students in the first to fourth grades of XX University, and then the research subjects were screened out. A total of 800 SDSs were issued, and 780 were valid questionnaires. According to the Depression Assessment Criteria, these respondents were classified, that is, those with scores greater than or equal to 45 were taken as the objects of this study, as shown in Table 1.

Table 1. Distribution of the screening research objects

Score	N	Percentage
≥45	145	18.59%
30~45	92	11.79%
<30	543	69.62%
Total	780	100%%

Affected by various factors such as heavy coursework and high pressure for the students,

the detection rate of college students' depression and depression tendency is much higher than that of the general population. Such a high detection rate of depression reflects that the mental health problems of college students are becoming more common in colleges and universities. It also proves the importance of our experimental research.

Classifying the depression levels of the depression students

According to the SDS depression assessment criteria, 145 depression students were classified in terms of depression level. Table 2 below lists the results.

Table 2. Classification of depression levels in patients with depression

Depression level	Treatment cycle (week)	N	Percentage
Light	3	99	68.28%
moderate	5	32	22.07%
severe	7	14	9.66%
Total	15	145	100%%

It can be seen from Table 2 that among the 145 depression patients with SDS score (>41), 68.28% had mild depression, with the treatment cycle of more than 3 weeks, 22.07% of patients had moderate depression, with the treatment cycle of more than 5 weeks, and 9.66% of patients had major depression, with the treatment cycle of more than 7 weeks. Thus, the depression level of college students was mostly in the initial stage. According to the collected questionnaires, the depression detection rate of first-year college students was less than 12%, while that of second-, third- and fourth-grade college students was on the rise. This may be due to the changes in the social environment of the school, the relationship between students and employment pressure, etc. as more learning is further made in higher grade.

RESULT ANALYSIS

Many studies have shown that competitive sports have the following mental health values: 1) a sense of security; 2) increased independence; 3) elimination of tension; 4) increased value; 5) formation of friendship and reputation. Therefore, regular physical exercise can cure depression. Chinese college students

are at the most precious stage of their lives and grows up fast. Regular exercise contributes to their significant enhancement of the visceral mechanism and the development of the nervous system, which can bring many benefits to future work and life of the students.

In order to study the influence of long-distance running on college students' depression, 145 college students with certain depression were trained for 2 months. The results were analysed as follows.

Changes in the SDS depression level before and after the experiment

Table 3. Comparison of SDS depression level test results before and after experiment

Observational dimension	Pre-experiment	After the experiment	P
Psych emotional symptoms	5.83±2.11	4.66±1.14	0.028
Somatic disorder	15.79±3.76	13.83±3.25	0.063
Psychomotor disorder	4.87±1.54	4.01±1.21	0.069
Psychological disorder of depression	22.16±4.24	8.37±4.88	0.029
Total SDS score	48.29±5.14	40.5±5.27	0.000

Table 3 shows that the mean values of all observed dimensions for SDS depression levels before and after the experiment vary greatly. According to the test criterion $A=0.05$, there were significant differences between somatic disorder and psychomotor disorders ($P<0.05$), between psychological disorder of depression and psychomotor disorders, between the mean values of total SDS scores.

Changes in the depression levels of HAMD24 before and after the experiment

Table 4 indicates that the HAMD24 depression scores before and after the experiment were tested by paired t test. According to the test standard $A=0.05$, except the body weight, the factors of cognitive barrier, diurnal variation, and despair were all significantly different ($P<0.05$), indicating that there were significant differences in HAMD24 anxiety/somatization, block, sleep disorders, and total depression scores before and after the experiment ($P<0.01$).

Correlation between SDS and HAMD24 depression scales

Correlation analysis between the total SDS

score and the total HAMD24 depression score before and after intervention was performed to verify the results of this experiment.

Table 4. Comparison of HAMD24 depression level scores before and after the experiment $x\pm s$

Observational dimension	Pre-experiment	After the experiment	P
Anxiety/somatization	5.25±1.71	3.88±1.99	0.01
weight	0.46±0.71	0.48±0.63	0.716
Cognitive barriers	5.21±1.76	4.33±1.43	0.021
diurnal variation	0.38±0.72	0.10±0.42	0.051
block	7.17±2.26	4.96±2.28	0.002
Sleep disorder	4.08±1.86	2.67±1.98	0.011
A sense of despair	5.08±1.79	4.21±1.89	0.044
Total score	27.63±4.17	20.29±4.69	0.002

Table 5 shows that the total score of the SDS is significantly positively correlated with that of the HAMD24, indicating that the experimental results are valid.

Table 5. Correlation between SDS and HAMD24 scores before and after the experiment

Project	SDS $x\pm s$	HAMD24 $x\pm s$	r	P
Pre-experiment	48.17±5.15	27.63±4.18	0.839	0
After the experiment	40.38±5.28	20.29±4.72	0.652	0

Comparison of changes in physical function before and after the experiment

In this experiment, three physical function indicators of resting heart rate, vital capacity and blood pressure, and other three indicators such as sitting forward bending, reaction time, standing on one foot with closed eyes were selected for physical health test. In addition, a single indicator of 30-second leg lift was established to verify the indicators of physical fitness before and after the intervention. The specific results are shown in Table 6.

Table 6 shows significant differences in resting heart rate and vital capacity before and after the experiments. Also, there are significant differences in systolic blood pressure, diastolic blood pressure, sitting forward bending, reaction time, leg lift for 30 seconds, standing on one foot with closed eye.

Table 6. Comparison of various indicators for physical function before and after the experiment $\bar{x} \pm s$

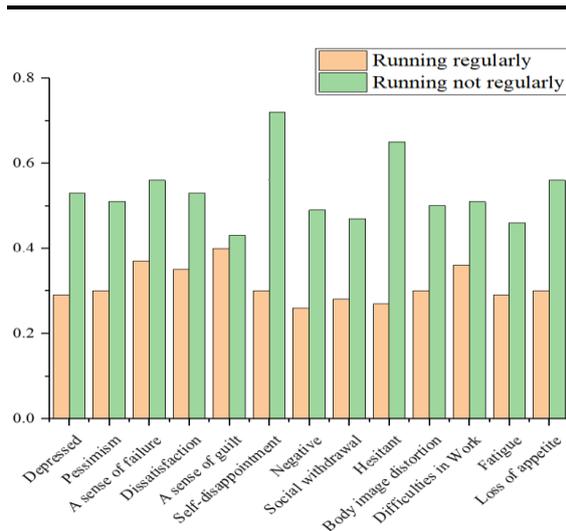
Index	Pre-experiment	After the experiment	P
Quiet heart rate	73.04±2.86	71.96±2.47	0.043
Vital capacity	2673.75±353.56	2835.38±313.96	0.054
Systolic blood pressure (mmHg)	123.25±6.92	117.54±6.43	0.019
Diastolic blood pressure (mmHg)	74.13±2.78	71.96±2.43	0.021
Sitting forward bending	13.04±2.53	16.17±2.16	0.012
Reaction time (S)	0.43±0.16	0.41±0.15	0.018
30 seconds elevated leg	88.92±12.04	96.79±11.76	0.017
Stand on one foot with closed eyes	34.38±9.21	42.88±9.58	0.016

DISCUSSION AND ANALYSIS

Depression index of male college students running regularly or not regularly

The depression indexes of male college students running regularly or not regularly is shown in Figure 1.

Figure 1. Comparison of depression indexes between male college students who run regularly or no regularly



It can be seen from Figure 1 that male college students running not regularly have higher depression indexes than those running regularly. Thus, the male college students should take

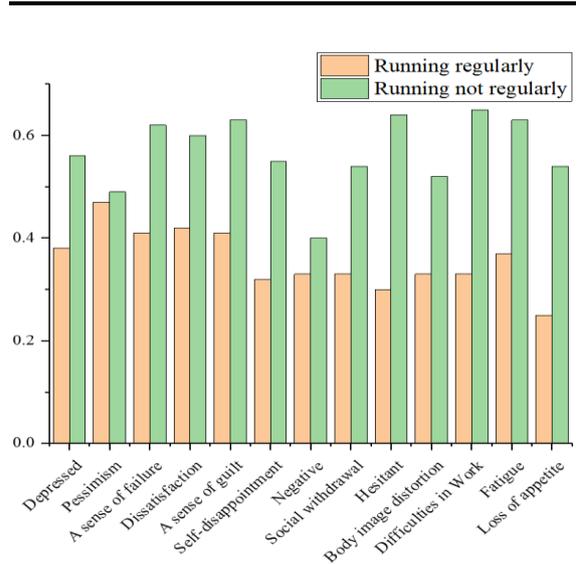
exercise regularly and improve depression.

Depression index of female college students running regularly or not regularly

The depression indexes of female college students who run regularly or not regularly are shown in Figure 2.

It can be seen from Figure 2 that female college students who do not run regularly have a higher tendency to depression than those running regularly, indicating that female college students running not regularly tend to mild depression, mainly due to the heavy learning burden and high employment pressure. Therefore, female college students should often participate in physical exercise, which is conducive to regulating their physiological disorders and psychological barriers.

Figure 2. Comparison of depression indexes between female college students running regularly or not regularly



Comparison of depression index between male and female college students after regular running

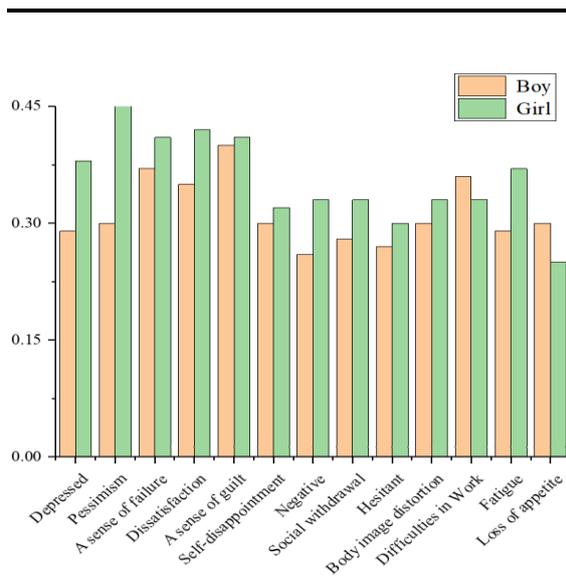
The depression indexes of male and female college students after regular running are shown in Figure 3.

Figure 3 indicates that most male college students have better depression indexes than females, but in the same level. So, depression of male and female college students is still an important difficulty in mental health problems.

Table 6. Comparison in measured STAI result between the depressed male/female students and the general population $\bar{x} \pm s$

	Male College Students	General Male	Female College Students	General Female
S-AI	40.95 \pm 7.02	39.71 \pm 8.89	42.84 \pm 7.05	38.97 \pm 8.45
T-AI	43.75 \pm 7.86	41.19 \pm 7.38	44.25 \pm 7.12	41.27 \pm 7.68

Figure 3. Comparison of depression indexes between male and female college students



Further, the results of state-trait anxiety inventory (STAI) measured for male and female college students were compared with the general population, as shown in Table 6.

It can be seen from Table 6 that the state anxiety of male college students S-AI was 40.95 \pm 7.02 and that of female college students S-AI was 42.84 \pm 7.05; the trait anxiety of female college students is slightly higher than male college students, indicating that both show psychological stress and anxiety, but the female college students are more likely to develop short-term anxiety than males.

Meanwhile, the trait anxiety T-AI of male college students was 43.75 \pm 7.86, and T-AI of male general population was 41.19 \pm 7.38, indicating that male college students' trait anxiety experience is significantly higher than general population; female college students' trait anxiety score T-AI was 44.25 \pm 7.12, and the general population' trait anxiety score T-AI was 41.27 \pm 7.68, indicating that the anxiety of female college students is significantly higher than that of the general population.

CONCLUSIONS

Through theoretical exploration and empirical research, the following conclusions are drawn:

(1) College students generally have certain anxiety and depression. However, these psychological problems are easily overlooked in colleges and universities, especially in those with high learning pressure, schools, teachers and parents need to carefully observe and discover these problems in time, and take prevention and control measures in advance, in order to avoid the occurrence of emergencies;

(2) The experimental results of long-distance running showed that the anxiety/somatization factor, block factor, sleep disorder factor and total depression score after training were improved, and the college students running not regularly have a higher tendency to depression when compared with the college students running regularly;

(3) Long-distance running can significantly improve depression. Therefore, for college students with depression, they should actively participate in long-distance running exercise, take a correct attitude and scientific exercise method for the body to gain a sense of pleasure, and get through the critical period of growth successfully.

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