

A study on the influence of long-distance running with Different exercise intensity on college Students' anxiety and sleep quality

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Abstract: The state attaches great importance to the physical and mental development of college students, and attaches great importance to the positive development of college students' physical quality and mental health. Sleep quality and anxiety among college students have become the mainstream chronic diseases in colleges and universities, which are important problems to be solved urgently. The participation of long-distance running is of great value to improving students' physical quality and mental health. This paper studies the effects of experimental method and two-factor repeated measurement variance method on sleep quality and anxiety level of college students with different load intensity. The results show that long-distance running with different load intensity is of great value and significance in improving sleep quality and anxiety level of college students. However, middle-intensity long-distance running has the best effect on improving sleep quality and anxiety level of college students.

Keywords: long-distance running; Anxiety; The quality of sleep

1. Introduction

Lack of exercise leads to the rapid development of chronic diseases among college students, especially sleep quality and anxiety [1]. With the increasingly fierce international competition, the physical quality of higher talents has been included in the focus of education. The physical fitness level of college students has become the cornerstone of influencing the fate and future of the country [2]. Physical exercise plays an important role in promoting the development of college students' physical quality. However, college students who lack physical exercise are prone to obesity, insomnia and other related chronic diseases and anxiety levels. Logistic regression analysis found that the psychological problems caused by sedentary students were significantly higher than those caused by sports participation. Long-distance running, as one of track and field sports, is of great value to the improvement of college students' physical fitness and cardiopulmonary function. However, does long-distance running with different load intensities have any value to the improvement of college students' sleep quality and anxiety level? What is the value? This study aims at the above problems, hoping to provide a little help for the improvement of relevant theories in the field of sports rehabilitation.

2. Organization of the Text

2.1 methods

This study adopted three kinds of long-distance running intervention of load intensity and selected 90 college students with sleep quality and anxiety for empirical study.

2.1.1 Experimental method

The study adopted a mixed experimental design of 3(high load medium load low load)X3(before and after exercise intervention) With the intervention of long-distance running with different load intensity as independent variable and the sleep quality and anxiety of college students as dependent variables, a natural experiment method designed within and between groups was adopted.

Firstly, the self-rating anxiety Scale [3] and the Pittsburgh Sleep Quality Index Scale [4] were used to conduct a questionnaire survey on college students in Weihai Campus of Shandong Jiaotong University According to the anxiety score standard and PSQI score evaluation standard, male students with anxiety score greater than 60 and PSQI score greater than 7 were recorded, and 90 college students participating in this experiment were determined through inquiry and negotiation.

Using random sampling method, 90 college students were divided into three groups, 30 people in each group, respectively, high load intensity long-distance running, medium load intensity long-distance running and low load intensity long-distance running

Table 1 Homogeneity test of sleep quality and anxiety level of the three groups of college students

	Sum of squares	Degrees of freedom	The mean square	F	p
PSQI	12.671	3	5.89	0.355	0.713
Anxiety level	236.673	3	112.619	1.044	0.371

Univariate analysis of variance (ANOVA) was used to test the sleep quality (PSQI) and anxiety scores of college students in three load intensity groups. The results showed that there was no statistically significant difference in sleep quality (PSQI) and anxiety scores of college students ($P > 0.05$), indicating that the sleep quality (PSQI) and anxiety scores of college students in the first three groups were homogeneous, which could be compared.

During the experiment, the load intensity of students in the low load intensity group was controlled at the heart rate of 100 times/min, the heart rate of students in the medium load intensity group was controlled at the heart rate of 120-140 times/min, and the heart rate of students in the high load intensity group was controlled at the heart rate of 150-160 times/min. It lasted for eight weeks, from 17:00 to 19:00 on Monday, Wednesday and Friday every week. The total load is controlled at 10000 meters. In the fourth week and the eighth week of the experiment, the sleep quality and anxiety level of college students were tested twice.

2.1.2 Two-factor repeated measures ANOVA

In this study, three load-intensity long-distance running exercises were used as intervention factors, and sleep quality and anxiety levels were used as effect variables. The advanced general linear model of SPSS software was used to repeat the measurement. The sleep quality and anxiety levels measured three times were put into the subject inner frame, and the load intensity was put into the subject interfactor. Based on the results of multivariable test, spherical symmetry test, univariate test and intra-subject comparison test, the effects of long-distance running training with different load intensity on sleep quality and anxiety level of college students were analyzed according to homogeneity of variance, factor comparison, contour diagram and time comparison.

3. Results and analysis

3.1 Influence of long-distance running intervention with different load intensity on sleep quality and anxiety level of college students

Table 2 Repeated measure variance analysis of exercise intervention on variable

variable	Sources of variation	III Sum of squares	Degrees of freedom	The mean square	F	η_p^2
PSQI	time	1189.42	3	3417.89	19.877***	0.112
	Time X Group	289.571	9	48.95	2.768**	0.029
	Group	55.718	3	75.389	3.971**	0.077
Anxiety level	time	2577.841	3	1192.871	14.876***	0.081
	Time X Group	1290.671	9	1133.593	7.255**	0.067
	Group	1542.492	3	1679.566	8.294***	0.087

Repeated measures anOVA of 3 (groups: high intensity group, medium intensity group and low intensity group) x3 (time: before the experiment, four weeks of the experiment and eight weeks of

the experiment) was used. The results show that: The main effect of time factor on sleep quality of college students with different load intensity was statistically significant [$F=19.877$, $\eta^2 p=0.112$], and the interaction effect between time and group was statistically significant [$F=19.877$, $\eta^2 p=0.112$]. There was statistical significance among groups with different load intensities [$F=3.977$, $\eta^2 p=0.077$]. The main effect of time factor on sleep quality of college students with different load intensity was statistically significant [$F=14.876$, $\eta^2 p=0.081$], and the interaction effect between time and group was statistically significant [$F=7.225$, $\eta^2 p=0.067$]. There was statistical significance between different load intensity groups [$F=8.294$, $\eta^2 p=0.077$].

The results of FIG. 1 show that the sleep quality and anxiety level of college students in the three load intensity groups were investigated at the time nodes of the fourth and eighth weeks. The results show that the PSQI and anxiety level of college students in the medium load intensity group are most significantly improved, followed by those in the high load intensity group. The PSQI and anxiety levels of students with mild load intensity were also improved, but the overall improvement effect was not significant.



Figure 1. Statistical chart of sleep quality and anxiety level of the three groups of college students

3.2 Correlation analysis of long-distance running load intensity, sleep quality and anxiety level

Table 4 Correlation analysis of long-distance running intensity, sleep quality and anxiety

	Distance running load intensity	The quality of sleep	Anxiety level
Distance running load intensity	1		
The quality of sleep	0.289	1	
Anxiety level	0.337	0.673	1

The results in Table 4 showed that the intensity of long-distance running, sleep quality and anxiety level showed a significant positive correlation, and sleep quality showed a positive correlation with anxiety level. Therefore, there is a significant correlation between each variable, which is conducive to further research and exploration.

3.3 Discussion

According to the theory of group training of Chinese scholar Tian Maijiu, it belongs to the physical fitness leading endurance events, and the participation of long-distance running can effectively improve the state of cardiopulmonary function. Exercise intervention plays an important role in promoting the development of college students' mental health. Chinese scholar Ye Mei pointed out in her research that there was a strong correlation between physical activity time, screen time, sleep and anxiety, and the longer physical activity time, the higher sleep quality and the lower anxiety level, while the longer screen time, the worse sleep quality and the higher anxiety level [5]. Studies have pointed out that through exercise rehabilitation for college students with anxiety, their anxiety level has been significantly improved and promoted, which is conducive to the improvement of college students' anxiety [6]. Relevant research results are consistent with that of this study, but the uniqueness of this study lies in the discovery of a certain correlation between

anxiety and sleep quality. Therefore, it lays the foundation for further research on anxiety and sleep quality improvement.

4. Conclusion

The sleep quality and anxiety of college students have become new chronic diseases. As an important means of exercise rehabilitation, sports should play an active role in the research. The study was conducted to understand the effects of long-distance running with different load intensity on sleep quality and anxiety of college students. The results show that long-distance running can improve the sleep quality and anxiety of college students, and the most significant effect is the moderate intensity of long-distance running. Therefore, this study will call on relevant universities to promote long-distance running training of medium load intensity, which will lay an important foundation for reducing anxiety level of college students and improving sleep quality.

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