

Effects of Physical Activity and Coping Styles on Depression in Chinese College Students

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Abstract: The relationship between physical activity and cognitive coping is an important factor affecting depression in college students. A standardized questionnaire was used to investigate 976 16-23 year old single college students from a university in Hefei, Anhui Province, China. To analyze the relationship between physical activity, cognitive coping and depression in college students. Through the perspective of individual students, teachers and counselors, some guiding suggestions are put forward to improve the psychological condition of college students, and provide support for college students how to learn better, adapt to the society and have a healthier psychological condition. The results showed that there was significant correlation between cognitive coping and depression, physical movement and depression. The average depression scores of college students were significantly higher in female, senior, over 21 years old and Liberal arts than other groups. In the comparison of coping style scores among different groups, there are significant differences between Age and Grade. There are also significant differences in sex, Age, Grade and subject type in the comparison of physical activity scores of college students among different groups.

Keywords: Chinese College Students, Depressive, Coping, Physical activity.

1. Introduction

Depressive symptoms, also known as depressive affective disorder, refer to a psychological disorder caused by many factors such as society, family background, life and personality [1]. College students, as a special group, are in an important stage of life growth and transformation, facing many changes in life and psychological conditions, their emotions are more likely to fluctuate in the process of growth than adults; At the same time, with the rapid development of China's social economy and the popularization of higher education, the scale of college enrollment continues to expand, leading to increasing employment pressure on college students upon graduation [2,3], and further increasing social requirements on college students' ability, which makes contemporary Chinese college students, no matter in terms of interpersonal relationship, more and more important. In addition, the pressure of study, postgraduate entrance examination and employment is increasing, so the number of college students with mental health problems shows a gradually rising trend every year [4]. The mental health of college students has gradually become a problem worthy of attention. It should arouse wide attention and attention of the whole society.

This paper mainly studies the correlation between physical activity and coping style and depression of college students, which is helpful for the early prevention and effective intervention of depression in clinical practice. In the face of academic and personal challenges, it is of great significance for college students to actively integrate various strategies into daily life to enhance their mental health and adaptability.

2. Participants and Measures

2.1. Participants

In this study, stratified random cluster sampling method was used to select students from grade 1 to grade 4 of pharmacy College in a private comprehensive undergraduate university in Anhui Province. The School of Pharmacy consists of four disciplines: Pharmacy, Pharmaceutical Engineering, Pharmaceutical preparation and pharmacy. Randomly selected by the class as a unit for collective testing, the main test before the test introduced the purpose of the test, to dispel the concerns of the subjects, encourage the real answer, the time is controlled within one hour. A total of 1,000 college students took part in the survey. After completing the completeness and authenticity of the questionnaire, the researcher checked the questionnaires one by one, excluded 33 incomplete answers and questionnaires with obvious reaction tendency, and finally retained 967 valid questionnaires. The basic situation of the students participating in the questionnaire is shown in Table 1. This experiment was approved by the LPU-B Research Ethics Review Committee (RERC Code: A1-2023-129), and all 1000 students participated voluntarily and signed the informed consent.

Table 1 shows the summary distribution of participants. As can be seen from Table 1, among the students participating in the questionnaire, there are more females than males, the largest number of college students aged 18-20 years, the most distributed grade is the third grade, and the students majoring in liberal arts are more than those majoring in science.

Table 1. Respondent's Demographic Profile(n=976)

Profile	F	%
Sex		
Male	443	45.4
Female	533	54.6
Age		
16 – 17 years old	58	5.9
18 – 20 years old	512	52.5
Over 21 years old	406	41.6
Grade Level		
First-Freshman	133	13.6
Second-Sophomore	349	35.8
Third-Junior	367	37.6
Fourth-Senior	127	13.0
Major		
Science and engineering	473	48.5
Liberal Arts	438	44.9

2.2. Measures

2.2.1. Self-Rating Depression scale (SDS)

The Self-Rating Depression Scale (SDS) test is a tool for measuring depression symptoms in college students. It was developed by Duke University professor William W.K. Chong in 1965-1966. There are 20 projects in total, and each project is divided into 7 levels. The depression self-rating scale is composed of four factors including psychotic emotional symptoms, somatic disorders, psychomotor disorders and depression. Use a 4-point scale, from "1" (no or little time) to "4" (most or all time). A rough score is obtained by adding the scores for each of the 20 items. The base score is equal to the integral part of the rough score multiplied by 1.25. The normal upper limit of the total crude score is 41 points and the baseline total score is 53 points. Depression severity = cumulative score of each item / 80: 0.5; 0.5 ~ 0.59 were mild to mild depression; 0.6-0.69 is moderate to severe; 0.7 and above are considered major depression. In this study, the α coefficient of the scale was 0.85.

2.2.2. Physical Activity Rating Scale(PARS-3)

The physical activity Scale (PARS-3) revised by Liang Deqing et al[5], was used to test the respondents amount of physical activity. This scale evaluates the amount of physical exercise from three aspects: intensity, time and frequency of physical exercise. In addition, the PARS-3 is a self-report questionnaire designed to assess physical activity levels in adults. It is a simple and convenient tool that can be used to measure both moderate-intensity and vigorous-intensity physical activity.

Measured by the test is in terms of exercise amount = exercise intensity \times exercise time \times exercise frequency, exercise intensity and exercise frequency from 1 to 5 grades, respectively recorded 1 to 5 points, exercise time from 1 to 5 grades, respectively recorded 0 to 4 points, the highest score is 100 points, the lowest score is 0 points, the evaluation standard of exercise amount: ≤ 19 is divided into fluctuation amount; 20~42 were classified as moderate exercise; ≥ 43 is classified as heavy exercise. The retest reliability of PARS-3 was 0.82.

2.2.3. Coping Style Questionnaire

This was compiled by Xiao Jihua[6], according to the cultural background of China by referring to the questionnaire content of coping studies at home and abroad and relevant coping theories. The scale adopts multi-level scoring, and the positive coping dimension is composed of 1-12 items, which mainly reflects the characteristics of positive coping, such as

"try to see the good side of things" and "find several different ways to solve problems". The negative coping dimension consists of 13-20 items, which mainly reflect the characteristics of negative coping. The mean score for the positive coping dimension was 1.78 and the standard deviation was 0.52. The mean score and standard deviation of the negative coping dimension were 1.59 and 0.66.

2.3. Data Analysis

The data is analyzed using specialized statistical tools. Percentage and frequency were used to determine the allocation of study participants. The average level of physical activity and cognitive coping of college students was measured by weighted average method. When respondents were grouped by gender, grade, age and subject type, ANOVA and Scheffe Post-Hoc test were used to test the significance of differences among variables. In this study, Pearson-product temporal correlation was used to examine the significant relationship between physical activity, emotional regulation, and cognitive coping.

3. Results

3.1. Analysis of Scores of Each item in SDS

Table 2 shows the difference in SDS scores of different groups. The results show that the average depression scores of college students are in the $p < 0.01$ of Sex, Age, Grade and Subject, indicating that there is a significant difference, that is, different populations in the above aspects, there are significant differences. Through further comparison, it can be seen that the SDS scores of female, senior, older and Liberal arts groups are significantly higher than those of other groups. $p > 0.05$ of Residence, indicating no significant difference.

Table 2. Differences on the Respondent's Symptoms of Depression When Compared according to Profilen (976)

	t/F	p-value	Interpretation
Sex	-4.420	0.000	Significant
Age	23.826	0.000	Significant
Grade Level	17.082	.0.000	Significant
Major	-4.567	0.000	Significant
Residence	1.114	0.266	Not Significant

Difference is significant at 0.05 alpha level

3.2. PARS-3 Scale of Each Item Score Analysis

According to the analysis in Table 3, $p < 0.05$ of sex, Age,

Grade and Subject was obtained in the comparison of the differences in physical activity scores among different groups, indicating that there is a significant difference, that is, different populations in the above aspects, there are significant differences. Through further comparison, it can be seen that the exercise level of male, lower age, lower grade, Science and engineering groups is significantly higher than that of other groups. $p > 0.05$ of other variables, indicating no significant difference.

Table 3. Differences on the Respondent's Physical Activity When compared according to Profile (n=976)

	t/F	p-value	Interpretation
Sex	2.757	0.006	Significant
Age	5.043	0.007	Significant
Grade Level	5.238	0.001	Significant
Major	3.103	0.002	Significant
Residence	1.060	0.289	Not Significant

Difference is significant at 0.05 alpha level

3.3. Analysis of the scores of the Coping Style Questionnaire

According to the analysis in Table 4, the differences in coping scores of different populations were compared, $p < 0.05$ of Age and Grade; indicating that there is a significant difference, that is, different populations in the above aspects, there are significant differences. Through further comparison, it can be seen that the coping scores of the younger and lower grade groups are significantly higher than those of other groups. $p > 0.05$ of other variables, indicating no significant difference.

Table 4. Differences on the Respondent's Coping when compared according to Profile(n=976)

	t/F	p-value	Interpretation
Sex	1.394	0.164	Not Significant
Age	4.878	0.008	Significant
Grade Level	4.556	0.004	Significant
Major	1.928	0.054	Not Significant
Residence	0.667	0.505	Not Significant

Difference is significant at 0.05 alpha level

3.4. Correlation analysis of Depression, Coping and Physical Activity

It can be concluded from the analysis of Table 5 that there is a significant correlation between cognitive coping and SDS, physical exercise and SDS, and the correlation coefficient of each variable is less than 0, indicating a significant negative correlation. The results of this study show that there is a significant negative correlation between physical activity and depression, and exercise has a preventive and therapeutic effect on depression, and is an effective behavioral method to reduce depressive symptoms. There is a significant correlation between cognitive coping and depression, and coping styles have a direct predictive effect on depression. Positive coping styles can reduce the level of stress response and thus reduce the occurrence of individual depression, while negative coping styles can increase the level of individual depression. There is a significant correlation between cognitive coping and exercise, and the correlation coefficient of each variable is greater than 0, indicating a significant positive correlation. Positive cognitive coping attitude has a positive effect on sports behavior. Literature References.

Table 5. Correlation Matrix of the Variables of the Study(n=976)

	Coping			Physical Activity		
	rx	P-value	Interpretation	rx	P-value	Interpretation
Depression	-0.476	.000	Significant	-0.408	.000	Highly Significant
Coping	-	-	-	0.190	0.000	Highly Significant
Physical Activity	0.190	0.000	Highly Significant	-	-	-

Legend: Relationship is significant at 0.05 alpha level

Word's References feature or numbered list. In the reference list, provide up to three authors' names; if more than three authors, use "et al." Place a space between an authors' initials. Papers that have not been published should be cited as "unpublished" [7]. Papers that have been submitted or accepted for publication should be cited as "submitted for publication" [8]. Please give affiliations and addresses for personal communications [9]. Use sentence case for the words in a paper title.

4. Discussion

4.1. Relationship between physical activity and depression

There is a significant negative correlation between physical activity and depression, and the results are basically consistent with previous studies [7,8]. Physical exercise is an effective way to maintain or promote mental health and eliminate mental illness. Therefore, at present, physical exercise as a means of psychological treatment and

improvement of mental health has become a common method at home and abroad. College students are in the youth stage and are easily affected by the changes of the surrounding environment, and their emotions fluctuate greatly. The control of emotions is particularly important in this period. Emotional control is not unlimited suppression of one's emotional responses, on the contrary, continuous suppression will lead to psychosomatic disorders. Depression is a deeper complex negative emotion, which may be sadness, fear, anxiety, shame and even guilt accompanied by a sense of loss of life value, which lasts longer and brings greater pain. A study on college students shows [9] that the higher the amount of physical exercise, the lower the scores of depression, anxiety and sleep quality, and the higher the level of mental health of college students; This is because physical exercise can produce rich emotional experience, and participation in appropriate physical exercise can obtain more pleasure, comfort, smooth experience, satisfaction and sense of fulfillment, showing an overall psychological good state, which has a great impact on the mood and emotion of depressed patients, and plays an

important role in eliminating the emptiness caused by lack of interest or loss of depressed patients. The above results show that physical exercise can improve the depression of college students by enhancing self-concept, relieving emotion, improving self-esteem and self-confidence, cultivating harmonious interpersonal relationship and enhancing social adaptation.

4.2. Relationship between cognitive coping and depression

The results of this study show that there is a significant correlation between cognitive coping and depression, and coping styles have a direct predictive effect on depression [10,11]. Positive coping styles can reduce the level of stress response and thus reduce the occurrence of individual depression, while negative coping styles can increase the level of individual depression. Through the study, it is found that the negative coping style score of depressed people is significantly higher than that of non-depressed people, while the positive coping style score is significantly lower than that of non-depressed people. Correlation and regression analysis showed that positive coping had a significant negative correlation with depression and had a significant negative predictive effect. There was a significant positive correlation between negative coping and depression, and it had a significant positive predictive effect. This indicates that college students' coping styles are closely related to depression, and the more negative students' coping styles are, the more likely they are to experience depression. The coping styles of negative coping are important factors for college students to produce depression and other negative emotions.

5. Conclusion

This study showed significant differences in depressive symptoms and physical activity among college students by sex, age, and grade, but not by place of residence. However, only gender and grade level had a significant impact on coping mechanisms. The findings of this study demonstrate a strong positive correlation between coping mechanisms and depression, indicating that individuals who employ more effective coping strategies tend to experience lower levels of depression. Additionally, a strong negative correlation exists between physical activity and depression, suggesting that engaging in regular physical activity can help alleviate depressive symptoms.

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