

Research on the Impact of College Students' Sports Behavior on Their Mental Health

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Abstract

This paper analyzed students from Putian University in Fujian Province, China. Basic demographic information, physical activity volume, and psychological depression level of students were collected through a questionnaire. Then, independent sample t-tests, Pearson correlation coefficient analysis, and regression analysis were used to analyze physical activity amount and psychological depression level. The results showed that students' grade and body mass index had a significant positive correlation with the degree of psychological depression, whereas the amount of physical activity had a significant negative correlation with the degree of psychological depression.

Keywords

College Student, Mental Health, Physical Activity, Regression Analysis

1. Introduction

The physical and mental health of college students, who represent the backbone of China's future development, has received extensive attention from all sectors of society in the context of the knowledge economy and the intensifying social competition [1,2]. Psychological distress has affected students' academic achievements, social adaptation, and future development to varying degrees [3]. Moreover, the higher education stage is an important transitional period for psychological development in life. College students face various challenges such as the transition from adolescence to adulthood, independent living, career planning, and the establishment of emotional relationships. In this process, physical activity, as an active and healthy lifestyle, not only enhances physical fitness and boosts immunity, but also fulfills certain psychological adjustment functions [4]. An in-depth discussion of the relationship between physical activity and mental health among college students not only holds theoretical value but also offers guidance for mental health education and physical education curriculum reform in high education institutions. Dunn [5] analyzed whether exercise can effectively treat mild to severe depression and explored the relationship between exercise volume and the degree of depression relief. Collins [6] examined the impact of mindfulness interventions on test anxiety among nursing students in community colleges and found that systematic desensitization is a form of mindfulness that nursing students can use to reduce test anxiety. Baek et al. [7] used the general tension theory (GST) to analyze the factors

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influencing the behavior of running away from home. All the aforementioned studies have conducted research and analysis on students' mental health from various perspectives: some focus on the treatment and alleviation of depression, some on the alleviation of psychological anxiety, and others on the analysis of the behavioral manifestations of mental health. This paper, however, focuses on analyzing the factors that influence college students' mental health. By analyzing the impact of physical activities on mental health, it aims to provide effective references for safeguarding the mental health of college students and enhancing their mental health level. In this paper, data from students at Putian University in Fujian Province, China, were analyzed. Basic demographic information, physical activity amount, and depression levels of students were collected through a questionnaire. Then, independent sample t-tests, Pearson correlation coefficient analysis, and regression analysis were employed to analyze physical activity amount and depression levels.

2. Case Analysis

2.1 Subjects

This article analyzed students from Putian University in Fujian Province. The survey covered all the students in the university. After eliminating questionnaires with invalid responses, a total of 2,342 valid questionnaires were retained. The required data were collected using a questionnaire, the content of which is shown in Table 1.

Table 1. Content of the questionnaire

Item	Survey result/Answer
Basic information	
Gender	
Place of origin	
Whether an only child	
Grade	
Body mass index (BMI)	
Physical Activity Scale	
Q1. How intense is physical exercise?	① Light exercise (1 point) ② Low-intensity exercise (2 points) ③ Moderate-intensity exercise (3 points) ④ High-intensity unsustained exercise (4 points) ⑤ High-intensity sustained exercise (5 points)
Q2. How long is the duration of a single session of the above-mentioned intensity of physical exercise?	① Duration ≤ 10 min (0 points) ② 10 min < duration ≤ 20 min (1 point) ③ 20 min < duration ≤ 30 min (2 points) ④ 30 min < duration ≤ 60 min (3 points) ⑤ Duration > 60 min (4 points)
Q3. How many times do you do the above physical exercises every month?	① Up to 1 per month (1 point) ② 2 or 3 times a month (2 points) ③ 1 or 2 times a week (3 points) ④ 3-5 times a week (4 points) ⑤ Almost once a day (5 points)

Continued on the next page.

Table 1. Continued

Item	Survey result/Answer
Depression Self-Assessment Scale	The optional answers to each question include not in compliance, slightly in compliance, moderately in compliance, and severely in compliance, and are scored as 0, 1, 2, and 3 respectively.
Q1. Do you feel sad for a long time?	
Q2. Are you feeling discouraged?	
Q3. Do you consider yourself a loser?	
Q4. Do you feel powerless?	
Q5. Do you often feel self-blaming?	
Q6. Do you hesitate when making decisions?	
Q7. Have you been in a state of anxiety for a long time recently?	
Q8. Have you lost interest in life?	
Q9. Do you lack motivation when doing things?	
Q10. Do you feel pitiful about yourself?	
Q11. Do you have a poor appetite or binge eating?	
Q12. Are you having insomnia or feeling sleepy due to lack of energy?	
Q13. Do you lose your sexual desire?	
Q14. Do you often worry about your health?	
Q15. Do you have suicidal urges?	
Q16. Do you have long-term emotional distress?	

The questionnaire comprised three sections: basic demographic information, the Physical Activity Scale [8], and Depression Self-Assessment Scale. The basic information section included the respondents' gender, place of origin, only child status, grade, and body mass index (BMI). The Physical Activity Scale measures the respondents' amount of physical activity exercise. The scoring method was to multiply the scores of the three dimensions (intensity, duration, and frequency) represented by the three questions in Table 1, i.e., the amount of physical activity = intensity score $\times$ duration score $\times$ frequency score. The score ranged from 0 to 100 points. The higher the score, the greater the amount of physical activity. The Depression Self-Assessment Scale [9] measures the respondents' degree of psychological depression. The degree of depression was obtained by summing and converting the scores assigned to the answers to each question on the scales. The conversion formula is:

$$Y = \frac{X}{45} \times 100 \quad (1)$$

where X is the total score of the Depression Self-Assessment Scale of the respondent and Y is the rounded depression score after calculation.

2.2 Analytical Methods

SPSS software [11,12] and Excel were used to analyze the collected data. First, the data underwent preliminary testing. Then, independent sample t -tests and one-way analysis of variance [13] were employed to analyze the differences in physical activity amounts and depression degrees between students with different basic information characteristics. Next, the Pearson correlation coefficient analysis [14] was used for a preliminary analysis of the correlation between physical activity amount and depression degree. Finally, regression analysis [15] was used to further analyze the relationship between physical activity amount and depression degree.

2.3 Analysis Results

It can be seen from Table 2 that the Cronbach’s α coefficients for the basic information section, the Physical Activity Scale section, and the Depression Self-Assessment Scale section of the questionnaire were all greater than 0.9, indicating satisfactory reliability. The Kaiser-Meyer-Olkin (KMO) values were all greater than 0.7, and the results of the Bartlett’s test of sphericity further confirmed the collected data had sufficient validity. Overall, the test results demonstrate that the sample data collected via the questionnaire are suitable for subsequent analysis.

Table 2. Results of reliability and validity tests

	α	KMO	Bartlett’s test of sphericity		
			χ^2	<i>df</i>	<i>p</i> -value
Basic information	0.993	0.710	197.26	7	0.001
Physical Activity Scale	0.952	0.726	204.81	3	0.002
Depression Self-Assessment Scale	0.958	0.701	205.12	5	0.001

The independent sample *t*-test was employed to measure the differences in basic information indicators with respect to the amount of physical activity and the degree of psychological depression, and the results are shown in Table 3. It can be seen that there were significant differences in physical activity amount with regard to indicators such as gender, grade, and BMI, and significant differences in psychological depression with regard to grade and BMI.

Table 3. Differences in physical activity volume and degree of psychological depression between students with different basic demographic information

Variable		Physical activity amount	Degree of psychological depression
Gender	Male	38.21 ± 8.54	65.43 ± 9.68
	Female	21.36 ± 7.89	64.58 ± 9.74
	<i>t</i>	7.85**	1.23
Place of origin	Town	24.58 ± 8.98	67.21 ± 8.74
	Rural areas	23.97 ± 7.87	68.52 ± 7.98
	<i>t</i>	0.89	3.23
Grade	Freshman year	27.85 ± 7.89	57.66 ± 5.85
	Sophomore year	24.57 ± 7.46	59.78 ± 5.97
	Junior year	22.13 ± 7.58	62.34 ± 6.87
	Senior year	20.16 ± 7.66	64.75 ± 6.36
	<i>F</i>	3.98**	4.58**
Whether an only child	Yes	24.87 ± 8.54	63.12 ± 7.58
	No	24.67 ± 8.11	62.89 ± 7.89
	<i>t</i>	0.76	1.11
BMI (kg/m ²)	Underweight	18.97 ± 9.41	59.36 ± 6.87
	Normal weight	28.86 ± 8.46	61.21 ± 6.35
	Overweight	26.47 ± 8.78	63.88 ± 7.41
	Obesity	17.55 ± 8.37	65.39 ± 7.34
	<i>F</i>	8.23**	7.45**

** indicates significant at the 0.01 level.

It can be seen from Table 4 that the Pearson correlation coefficient between the degree of psychological depression and the amount of physical activity was -0.356, which was significant at 0.01 level.

There were two regression models in Table 5. Model 1 took the degree of psychological depression as the dependent variable and performed regression calculations for gender, place of origin, grade, whether an only child, and BMI. Model 2 also took the degree of depression as the dependent variable but introduced a new variable, physical activity amount, into Model 1, for regression calculation. Among the basic information variables in Model 1, “grade” and “BMI” exhibited significant positive correlations with the degree of psychological depression, and the overall R^2 was 0.101. In Model 2, after the introduction of variable “physical activity amount”, the regression coefficients for each variable in the model changed. Among them, “grade” and “BMI” continued to show significant positive correlations with the degree of psychological depression, while the newly “physical activity amount” showed a significant negative correlation with the degree of psychological depression. Moreover, the R^2 of Model 2 was 0.302. This indicates that the introduction of the new variable enhanced the explanatory power of the regression model.

Table 4. Correlation between physical activity volume and degree of depression

	Mean $\pm$ standard deviation	Physical activity amount	Degree of psychological depression
Physical activity amount	34.52 $\pm$ 5.87	1	
Degree of psychological depression	64.21 $\pm$ 8.59	-0.356**	1

** indicates significant at 0.01 level.

Table 5. Analysis results of the regression model

Variable	Model 1	Model 2
Gender	0.159	0.167
Place of origin	0.012	0.011
Grade	0.268**	0.287**
Whether an only child	0.018	0.015
BMI	0.257**	0.269**
Physical activity amount		0.358**
R^2	0.101	0.302

** indicates significant at 0.01 level.

3. Discussion

College students at the higher education stage are undergoing a crucial period of psychological development and transformation. They face multiple pressures and challenges, such as physical growth, independent living, and career planning, and thus bear considerable psychological stress. If left unaddressed, such stress can evolve into physical disorders. Physical activity not only strengthens the body, improves physical fitness, and helps prevent physical diseases, but also helps regulate one’s mental state to some extent during the exercise process. An in-depth investigation of the relationship between physical activity and mental health can offer effective references for promoting students’ physical and mental health.

This paper analyzed students from Putian University in Fujian Province. It used a questionnaire to collect demographic information, physical activity exercise amount, and degree of psychological depression from the students. Independent sample *t*-tests were employed to analyze differences in physical activity exercise amount and degree of psychological depression between students with different demographic characteristics. The Pearson correlation coefficient analysis was used for a preliminary analysis of the correlation between physical activity amount and depression. Regression analysis was conducted to further examine the relationship between physical activity amount and depression.

The results of the independent sample *t*-test showed that there were significant differences in physical activity amount with regard to gender, grade, BMI, and other variables. Specifically, the physical activity amounts of male students, lower grade students, and students with normal weight were significantly higher. This may be because male students were generally physically stronger than female students and are therefore able to engage in more consistent exercise. Students in lower grades have less academic and career-related urgency, allowing them to dedicate more time to exercise. Students with normal weight are less burdened by weight-related concerns and can exercise more consistently. There were significant differences in degree of depression among students with different grades, BMI, and other indicators. Students in higher grades and with higher weights had higher degrees of psychological depression. This may be attributed to the fact that higher grades are associated with greater academic and job-search pressure, while higher BMI has a greater impact on overall physical and mental health.

The results of the Pearson correlation coefficient analysis showed that the degree of psychological depression had a significant negative correlation with the amount of physical activity, i.e., as one increased, the other decreased. In the subsequent regression analysis results, grade and BMI exhibited significant positive correlations with the degree of depression, regardless of whether “physical activity amount” was introduced into the regression model. Moreover, the introduced variable “physical activity amount” was significantly and negatively correlated with the degree of depression, and the R^2 value increased after its introduction, indicating that physical activity amount exerts a significant impact on the degree of depression.

4. Conclusion

This paper analyzes students from Putian University in Fujian Province. A questionnaire was designed to collect demographic information, physical activity amount, and degree of psychological depression from the students. Independent sample *t*-tests were employed to analyze the differences in physical activity volumes and degrees of psychological depression between students with different demographic characteristics. Pearson correlation coefficient analysis and regression analysis were used to analyze the correlation between physical activity amount and the degree of depression. It was discovered that there were significant differences in physical activity with regard to variables such as gender, grade, and BMI, and significant differences in the degree of depression with regard to indicators such as grade and BMI. A significant negative correlation was found between the degree of depression and the amount of physical activity. Regression analysis showed that grade and BMI exhibited significant positive correlations with depression degree, while physical activity amount was significantly and negatively correlated with depression degree.

Conflict of Interest

The author declares no competing interests.

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