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An Experimental Study on the Impact of Sports Dance Exercise on College Students' Mental Health

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Abstract: This study explores the impact of sports dance exercise on college students' mental health through a controlled experiment. Sixty non-physical education major students from a university were selected and randomly divided into an experimental group (30 students, receiving 12 weeks of sports dance training) and a control group (30 students, maintaining their original lifestyle). The Symptom Checklist-90 (SCL-90) was used to measure the mental health level of the two groups before and after the experiment. The results showed that after the experiment, the total score of SCL-90 and the scores of each factor (including somatization, obsession-compulsion, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism) in the experimental group were significantly lower than those in the control group ($p < 0.05$), and there was also a significant decrease in the experimental group when comparing its own pre-experiment and post-experiment scores ($p < 0.01$). The conclusion indicates that regular sports dance exercise can effectively improve college students' mental health, alleviate various negative psychological symptoms, and is an effective means to promote college students' mental health. It is suggested that colleges and universities should widely promote sports dance courses.

Keywords: Sports dance; College students; Mental health; SCL-90; Experimental study

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1. Introduction

As a sports event with strong appreciation and high competitiveness, sports dance has been established as a compulsory course for dance majors in many institutions of higher education. College students are in a critical period of physical and mental development, and they face multiple pressures such as academic studies, employment, and interpersonal relationships, leading to increasingly prominent mental health issues [1]. Seeking positive and effective psychological intervention approaches has thus become an important topic in higher

education. As a form of exercise that integrates artistic expressiveness and physical fitness functions, sports dance, with its rhythmic features, social attributes, and the characteristic of coordinating the body and mind, is believed to have unique value in emotional regulation [2]. This study aims to empirically test the effect of regular sports dance exercise on improving specific dimensions of college students' mental health through a rigorous controlled experimental design, thereby providing a scientific basis for mental health promotion work in colleges and universities.

2. Research objects and methods

2.1. Research objects

Sixty college students (aged 19–22 years old) were recruited from a university, who met the following criteria: non-physical education majors, no history of regular dance training, and voluntary participation. They were divided into two groups using the random number table method: Experimental group (n = 30): 12 males and 18 females; and Control group (n = 30): 14 males and 16 females.

There were no significant differences between the two groups in terms of gender, age, or baseline SCL-90 scores ($p > 0.05$), indicating comparability. No participants dropped out during the experiment.

2.2. Research methods

(1) Experimental design: A randomized controlled trial (RCT) was adopted.

(2) Intervention protocol:

(a) Experimental group: Received 12 weeks of sports dance training, with 3 sessions per week and 90 minutes per session. The training covered basic dance styles such as waltz, cha-cha-cha, and rumba, and included four phases: warm-up (15 minutes), technical teaching and practice (50 minutes), routine combination and expressiveness training (20 minutes), and cool-down (5 minutes). Professional sports dance teachers conducted the training, ensuring a moderate exercise intensity (heart rate controlled at 60–75% of the maximum heart rate).

(b) Control group: Maintained their original study and living habits, without any systematic dance training or additional exercise intervention.

(3) Assessment tool: The widely used Symptom Checklist-90 (SCL-90) was employed. This scale consists of 90 items, covering 9 factors (somatization, obsessive-compulsive symptoms, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism) and 1 general symptom index. A 5-point Likert scale was used for scoring (1 = "none" to 5 = "severe"), where higher scores indicate more severe mental health problems. The scale has good reliability and validity. All participants were assessed one week before the experiment (T0) and within one week after the experiment (T1).

(4) Data processing: SPSS 26.0 software was used for statistical analysis. Measurement data were expressed as mean ± standard deviation (SD). An independent samples t-test was used for inter-group comparisons, and a paired samples t-test was used for intra-group pre-post comparisons. The significance level was set at $\alpha = 0.05$.

3. Research results

3.1. Intra-group comparisons

Experimental group: After 12 weeks of sports dance exercise, the total score of SCL-90 and the scores of all 9 factors in the experimental group were significantly lower than those before the intervention ($p < 0.01$), indicating a comprehensive improvement in their mental health status (**Table 1**). Control group: There were no significant changes in the total SCL-90 score or the scores of each factor in the control group between the pre-test and post-test ($p > 0.05$).

3.2. Inter-group comparisons

(1) Pre-test (T0): There were no significant differences in the total SCL-90 score or the scores of each factor between the two groups ($p > 0.05$), indicating consistent baselines.

(2) Post-test (T1): The total SCL-90 score and the scores of all 9 factors in the experimental group were significantly lower than those in the control group ($p < 0.05$) (**Table 1**).

Among these, the improvement in the factors of depression, anxiety, and interpersonal sensitivity was particularly notable.

Table 1. Comparison of total SCL-90 score and scores of each factor between the two groups of college students (mean ± SD)

Indicator	Group	Pre-test (T0)	Post-test (T1)	Intra-group comparison (T1 vs T0) *p*-value	Inter-group comparison (T1) *p*-value
Total score of SCL-90	Experimental group	145.83 ± 20.76	118.27 ± 15.42	0.000	0.001
	Control group	143.60 ± 22.15	142.13 ± 21.08	0.452	
Somatization	Experimental group	1.58 ± 0.42	1.32 ± 0.31	0.000	0.012
	Control group	1.55 ± 0.38	1.54 ± 0.37	0.802	
Obsessive-Compulsive	Experimental group	1.92 ± 0.48	1.61 ± 0.35	0.000	0.005
	Control group	1.90 ± 0.45	1.88 ± 0.44	0.678	
Interpersonal sensitivity	Experimental group	1.85 ± 0.41	1.48 ± 0.29	0.000	0.000
	Control group	1.83 ± 0.39	1.81 ± 0.38	0.735	
Depression	Experimental group	1.78 ± 0.46	1.35 ± 0.33	0.000	0.000
	Control group	1.76 ± 0.42	1.74 ± 0.41	0.715	
Anxiety	Experimental group	1.65 ± 0.39	1.28 ± 0.27	0.000	0.000
	Control group	1.63 ± 0.36	1.62 ± 0.35	0.826	
Hostility	Experimental group	1.53 ± 0.35	1.26 ± 0.28	0.000	0.008
	Control group	1.52 ± 0.33	1.51 ± 0.32	0.791	
Phobic anxiety	Experimental group	1.42 ± 0.31	1.19 ± 0.23	0.000	0.018
	Control group	1.40 ± 0.30	1.39 ± 0.29	0.855	
Paranoid ideation	Experimental group	1.48 ± 0.34	1.24 ± 0.26	0.000	0.010
	Control group	1.47 ± 0.32	1.46 ± 0.31	0.812	
Psychoticism	Experimental group	1.38 ± 0.28	1.16 ± 0.21	0.000	0.022
	Control group	1.36 ± 0.27	1.35 ± 0.26	0.781	

Note: Boldfaced *p*-values indicate that the differences are statistically significant ($p < 0.05$).

4. Discussion

This experimental study clearly confirms that 12 weeks of regular sports dance training exerts a significant and comprehensive positive effect on improving college students' mental health, and the results support the research hypothesis.

(1) The mind-body synergy effect is remarkable

Sports dance requires a high degree of coordination between body movements, musical rhythms, and emotional expression. This in-depth engagement of both mind and body can effectively divert individuals' excessive attention from negative thoughts and stress [3] and promote the release of neurotransmitters such as endorphins and serotonin in the brain [4], directly improving emotional states (e.g., significant reduction in depression and anxiety factors). Meanwhile, the moderate exercise intensity effectively alleviates somatization symptoms (e.g., feelings of fatigue, muscle tension, etc.).

(2) Social connection is strengthened

The inherent paired or group form of dance requires participants to engage in eye contact, physical coordination, and emotional interaction. The significant improvement in the "interpersonal sensitivity" factor among the experimental group confirms the unique value of sports dance as a form of "non-verbal social interaction" [5]. Such positive social interactions help college students establish a sense of belonging, reduce loneliness and social anxiety, and enhance social confidence.

(3) Self-efficacy is enhanced

The process of learning new dance steps, mastering complex routines, and completing elegant performances constitutes a continuous "challenge-success" cycle. The improvement in factors such as "obsession-compulsion," "hostility," and "paranoia" among the experimental group is partly attributed to the sense of control and accomplishment gained through skill mastery [6], which helps break the cycle of negative thinking and enhances psychological resilience in coping with stress.

(4) Emotional catharsis through artistic expression

Dance serves as a non-verbal channel for emotional expression and catharsis. Expressing inner emotions (especially those difficult to verbalize) through physical movements provides college students with a healthy outlet for emotions, helping to reduce the intensity of emotions such as anxiety and hostility (as reflected in the significant decrease in scores of relevant factors).

5. Conclusions and recommendations

5.1. Conclusions

Through a randomized controlled experiment, this study confirms that regular sports dance exercise (3 times a week, 90 minutes each time, lasting 12 weeks) can effectively and comprehensively promote the mental health of college students. The mechanism lies in the combined effects of the physical and mental benefits of exercise itself, the unique social interaction of dance, the sense of accomplishment brought by skill mastery, and the emotional catharsis of artistic expression. These factors significantly alleviate various psychological symptoms, including depression, anxiety, interpersonal sensitivity, and somatization.

5.2. Recommendations

(1) Incorporate into the curriculum system: Colleges and universities should proactively offer sports dance as a public physical education elective course or a compulsory module, increase the supply of such

courses, and enable more students to benefit from them.

(2) Enrich extracurricular activities: Support the establishment of sports and dance associations and clubs, regularly organize workshops, experience classes, dance parties, and on-campus competitions, and foster a campus dance culture atmosphere.

(3) Integrate into psychological services: The psychological counseling centers of colleges and universities can recommend or use sports dance as an auxiliary method for group psychological counseling or stress management training.

(4) Strengthen faculty development: Cultivate and introduce faculty members with dual competencies in sports and art to ensure the quality of teaching.

(5) Deepen research and exploration: Future research may focus on the differences in intervention effects between different dance styles (e.g., Latin dance vs. ballroom dance), different exercise frequencies/durations, long-term effects, and interventions targeting specific psychological issues (e.g., social anxiety).

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Disclosure statement

The authors declare no conflict of interest.

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