Optimization of Physical Exercise on College Students' Mental Well-Being

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Abstract: This research examines how physical exercise influences the mental well-being of college students and suggests practical strategies for promotion. A thorough review of existing literature highlights that consistent exercise can effectively reduce anxiety and depression, enhance self-confidence, improve sleep patterns, and boost cognitive abilities. However, excessive exercise might lead to adverse outcomes. This study outlines promotion strategies across three key areas: enhancing university physical education programs, nurturing a campus sports culture, and guiding independent student exercise routines. Specific actions include designing interest-driven curricula, establishing psycho-sports integration mechanisms, diversifying activity formats, and creating personalized exercise plans. These approaches aim to provide both theoretical foundations and practical guidance for universities seeking to strengthen their physical and mental health support systems.

Keywords: College students; Physical exercise; Mental health

1. Introduction

Modern college students face numerous challenges, such as academic competition and employment pressures, which have led to growing concerns about mental health issues. As an affordable and highly feasible intervention, physical exercise has been widely recognized for its psychological benefits. Despite this, practical obstacles remain, including low participation rates and lack of continuity. Most existing studies focus on the direct effects of exercise on psychological indicators but often overlook systematic promotion strategies. In response, this study integrates theoretical and empirical evidence to analyze how physical exercise impacts the mental health of college students. It proposes a framework for promoting strategies across three dimensions—education management, cultural development, and individual behavior—offering new perspectives for universities implementing an integrated "physical-mental health" model.

2. The Theoretical Foundation Linking Physical Exercise and Mental Health.

2.1 Psychological Mechanisms of Exercise

2.1.1.Physiological Impact of Exercise on Endorphin Release

Moderate-to-high intensity exercise stimulates the pituitary gland to release endorphins, natural painkillers that induce feelings of pleasure and reduce pain perception. Neuroimaging studies show that after 30 minutes of aerobic exercise, brain activity in the limbic system significantly increases, correlating with improved mood. Regular exercisers exhibit higher baseline levels of endorphins, explaining their greater emotional stability.

2.1.2.Attention Diversion and Stress Reduction Theory

Exercise redirects attention away from stressors, breaking cycles of negative thinking. According to cognitive resource theory, the attentional resources consumed during exercise reduce rumination capacity, particularly among anxious individuals. Clinical observations indicate that exercise can decrease stress hormone levels by 15% to 25%.

2.2 Sociological Interactions Of Exercise

2.2.1.Strengthening Social Support and Belonging

Team sports create social environments where interactions fulfill individual needs for belonging. Sociometric studies confirm that

students participating in team sports more than twice weekly exhibit a 30% higher social network density compared to isolated exercisers. This accumulation of social capital mitigates loneliness's adverse effects on mental health.

2.2.2.Enhancing Interpersonal Relationships Through Team Sports

Roles and collaboration demands within team sports foster empathy and trust development. Longitudinal data reveal that college students persistently engaging in team activities demonstrate significantly greater improvements in interpersonal sensitivity scores compared to those involved in individual pursuits. Enhanced social skills serve as protective factors against psychological problems arising from interpersonal conflicts.

2.3 Long-Term Exercise and Mental Resilience

Continuous exercise not only provides immediate psychological benefits but also cultivates stable psychological traits. Repeated exposure to exercise-related challenges fosters stronger stress-coping abilities and emotional regulation strategies. Brain science studies reveal increased gray matter density in the prefrontal cortex—a region strongly associated with executive function and emotional control—among long-term exercisers. Behavioral evidence indicates that college students exercising consistently for over a year adopt more positive coping styles when facing academic setbacks, with mental resilience scale scores increasing by an average of 20%. This transformation underscores the profound impact of physical exercise on psychological qualities.

3. Concrete Effects Of Physical Exercise On College Students' Mental Health

3.1 Positive Impacts

3.1.1 Reducing Anxiety and Depression

College students encounter various challenges, including academic pressure and social adaptation, making anxiety and depression prevalent. Studies demonstrate that regular physical activity reduces psychological stress by regulating neurotransmitter production (e.g., serotonin, dopamine, endorphins) and lowering cortisol levels. For instance, students engaging in moderate-intensity exercise over extended periods exhibit significantly lower anxiety and depression scale scores compared to non-exercising peers. Additionally, the focused state during exercise helps individuals temporarily escape negative thoughts, fostering positive emotional experiences.

3.1.1.Boosting Self-Efficacy and Self-Esteem

Physical exercise enhances confidence in one's abilities, known as self-efficacy. By setting and achieving athletic goals (e.g., completing a long run or mastering a skill), college students accumulate success stories and reinforce recognition of their potential. Objective changes, such as improved body shape and physical fitness, also promote enhanced body self-esteem. For example, team sport participants tend to display greater social confidence, while regular exercisers are more likely to maintain a positive self-image.

3.1.2.Improving Sleep Quality and Cognitive Function

Sleep disorders significantly impact college students' mental health. Moderate exercise regulates circadian rhythms, shortens sleep onset latency, and increases deep sleep proportions. From a cognitive perspective, exercise promotes neuron growth in the hippocampus, enhancing memory and learning efficiency. Surveys reveal that college students engaging in aerobic exercise at least three times weekly report better sleep quality and academic performance compared to more sedentary counterparts.

3.2 Potential Negative Effects

While physical exercise generally benefits mental health, excessive or unscientific practices may yield adverse effects. Some students pursue short-term goals (e.g., weight loss or athletic performance) through high-intensity training, leading to exercise addiction, physical fatigue, anxiety, mood swings, or injuries. Over-reliance on exercise as a sole psychological adjustment method may neglect other coping mechanisms. Therefore, emphasizing scientific exercise practices and avoiding extreme behaviors is crucial.

3.3 Differential Analysis Of Exercise Types

3.3.1.Aerobic vs. Anaerobic Exercise

Aerobic exercise (e.g., running, swimming), characterized by prolonged duration and

moderate intensity, promotes cardiovascular health and emotional stability, making it ideal for chronic stress relief. Anaerobic exercise (e.g., sprinting, strength training), through explosive movements, elevates adrenaline levels temporarily, potentially benefiting individuals requiring rapid stress release. The psychological benefits differ, suggesting exercise programs should align with individual needs and physical characteristics.

3.3.2.Team vs. Individual Sports

Team sports (e.g., basketball, soccer) enhance a sense of belonging through social interaction, reducing loneliness and improving interpersonal sensitivity. Individual sports (e.g., yoga, jogging) emphasize self-control and introspection, appealing to students preferring independent spaces. Research shows extroverts benefit more from group exercises, while introverts prefer individual activities. This distinction provides a theoretical basis for designing diversified physical education curricula in universities.

4. Promotion Strategies for College Students' Mental Health Through Physical Exercise

4.1 Recommendations for Enhancing University Physical Education

4.1.1.Interest-Oriented Curriculum Integration

Traditional sports curricula often prioritize standardized items (e.g., track and field, ball games), neglecting student interest diversity, resulting in insufficient participation enthusiasm. Universities should adopt an "interest-oriented" curriculum model, supplementing compulsory basic courses with diverse elective programs (e.g., rock climbing, frisbee, dance). Stratified teaching methods grouping students based on physical levels avoid frustration caused by "one-size-fits-all" assessments. For instance, after introducing optional yoga and tai chi classes, a university observed a 30% increase in attendance and significantly higher post-class independent exercise frequency. Flexible curriculum design enhances participation and helps students identify suitable exercise methods, fostering long-term motivation.

4.1.2.Integrating Mental Health into Physical Education

The integration of physical exercise and mental health remains underdeveloped in university education. Embedding mental health education into physical education courses is recommended, such as incorporating mindful breathing training in warm-up sessions or organizing group sharing sessions post-class to encourage emotional expression. Establishing a "sports counselor" system staffed by professional psychology teachers or trained physical education instructors enables regular psychological state assessments and targeted exercise program designs for students exhibiting anxiety or depression tendencies. Pilot projects indicate participants scoring 15% higher on mental resilience scales compared to control groups, highlighting the significant potential of synergistic sports-psychology interventions.

4.2 Building Campus Sports Culture

4.2.1.Expanding Sports Associations and Activities

Sports associations serve as critical channels for independent student participation, yet existing associations often focus narrowly on popular sports (e.g., basketball, soccer), failing to meet diverse needs. Universities should encourage niche sports club establishment (e.g., cycling, fencing) and provide venue and financial support. Non-competitive sports activities, such as campus marathons and fun sports games, held regularly lower participation thresholds and attract students with weaker sports foundations. For example, a university's "sports carnival" transformed traditional competitions into team cooperation games, increasing participant numbers by 50% compared to previous years, including female participation rising to 45%, effectively challenging the "sports belong to the minority" stereotype.

4.2.2.Publicity and Incentive Mechanisms Design

Cognitive biases toward physical exercise (e.g., "time-consuming and useless") hinder participation. Universities can leverage new media platforms (e.g., short videos, public accounts) to disseminate scientific sports knowledge, invite outstanding student-athletes to share experiences, and cultivate "sports role models." Regarding incentive mechanisms, sports participation could be incorporated into comprehensive quality evaluations or introduce "sports points exchange" systems (e.g., points exchanged for gym discounts or

sporting goods). A school's "21-day exercise clock program" revealed that 80% of students completing the clock formed regular exercise habits, proving short-term incentives facilitate behavioral change.

4.3 Scientific Guidance For Independent Student Exercise

4.3.1.Personalized Exercise Program Development

Individual differences among college students (e.g., physical strength, mental state) necessitate diverse exercise programs. Universities can recommend appropriate exercise types, intensities, and frequencies through combined physical testing and psychological assessments. For instance, students with low physical ability might start with low-impact aerobic exercises like brisk walking, while those with high anxiety could try soothing programs like yoga. Mobile health technologies (e.g., exercise apps) enable real-time monitoring of heart rate and calorie expenditure, dynamically adjusting plans. Studies show students receiving personalized instruction exhibit a 40% higher exercise adherence rate and more significant psychological improvement compared to those without personalized guidance.

4.3.2. Habit Formation and Maintenance

Habit formation relies on environmental cues and positive feedback. Students are advised to adopt a "micro-habit" strategy (e.g., exercising 10 minutes daily) and gradually increase intensity to prevent abandonment due to overly ambitious goals. Social support is vital, forming "sports buddy groups" to enhance accountability through mutual monitoring. Additionally, maintaining exercise journals visualizes progress and reinforces a sense of accomplishment. Follow-up studies indicate that 60% of students tracking exercise data remained regularly active a year later, compared to 25% in the control group.

4. Conclusion

Physical exercise serves as an effective means of promoting college students' mental health, yet realizing its full value requires systemic support, environmental shaping, and individual practice. The proposed strategy system emphasizes universities' leadership roles in curriculum reform and cultural construction while focusing on cultivating student autonomy, reflecting the integrated "teaching-learning-training" health promotion logic. Future research could explore differentiated needs among students from varying institutional types and professional backgrounds and validate long-term strategy effects. Continuous optimization of the physical exercise framework is essential for sustained success.

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