



The Effect of Basketball Activity on Developing the Mental Health of University Students in Shenzhen

Zhang Ciwan¹ and Chanchai Siriphan²

^{1,2}Faculty of Sports Science and Technology, Bangkokthonburi University, Thailand

¹E-mail: 1282162291@qq.com, ORCID ID: <https://orcid.org/0009-0009-2600-5954>

²E-mail: siriphan.cs@gmail.com, ORCID ID: <https://orcid.org/0009-0000-9981-655X>

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Abstract

Background and Aimes: The importance and status of basketball in China cannot be ignored, and its impact on the mental health of university students is also positive. By participating in basketball, university students can release stress, cultivate teamwork awareness and social skills, and enhance self-confidence and self-esteem, thereby improving their psychological state and promoting the development of mental health. Therefore, in-depth research on the impact of basketball on the mental health of university students is of great significance for promoting mental health education and promoting the comprehensive development of university students. The objectives of this study are as follows: To survey the mental health of university students in Shenzhen, to modify the basketball activity to develop the mental health of university students in Shenzhen, and to compare the difference in mental health before and after basketball activity participation.

Methodology: Shenzhen University selected a school to carry out campus basketball activities and randomly distributed questionnaires to 200 male and female college students aged 18-22. The tools used included a basketball court, sports equipment, an SCL-90 scale questionnaire, and SPSS21.0 software. This section provides a comparative analysis of mental health scores before and after the basketball intervention, using SPSS21.0 software. The t-test is employed for statistical comparison to understand the intervention's impact. The focus is on total scores, individual item scores, and factor scores, with specific attention to symptom domains.

Results: These findings are critical for evaluating the intervention's effectiveness in improving mental health. The investigation culminated in substantial evidence supporting the effectiveness of the intervention program. Statistically significant improvements were observed across various psychological health metrics, including total scores and individual item scores for anxiety, depression, somatization, and interpersonal sensitivity. The decline in scores from pre-intervention to post-intervention periods substantiates the positive impact of the intervention on the psychological well-being of the participants.

Conclusion: the comprehensive analysis of data underscores the intervention program's significant positive influence on diverse psychological health indicators. The observed statistically significant improvements in anxiety, depression, somatization, and interpersonal sensitivity collectively validate the program's efficacy in enhancing participants' overall mental well-being.

Keywords: Basketball Activity; University Students; Mental Health

Introduction

Basketball, as a global sport, has an important position and influence in China. Since the end of the 20th century, China's basketball industry has made significant progress, with the level of domestic basketball leagues constantly improving. Chinese men's and women's basketball teams have also achieved a series of excellent results in the international arena. Basketball has become one of the popular





sports in China, and it has received widespread attention and participation in schools, communities, and professional clubs.

In addition to the importance of basketball in sports competitions, its impact on the mental health of university students has also received much attention. With the development of society and the increase in life pressure, the mental health problems of university students are becoming increasingly prominent. As a coordinated physical and mental sport, basketball has unique advantages and can have a positive impact on the mental health of university students. Firstly, basketball can help university students release stress. Under the tense pace of learning and life, university students often face enormous pressure and are prone to psychological problems such as anxiety and depression. Participating in basketball can help university students temporarily put aside their worries and engage in games, release negative emotions through exercise, alleviate stress, and improve their mental health level. Secondly, basketball can cultivate university students' sense of teamwork and social skills. Basketball is a collective sport that requires close cooperation and mutual support among team members. By participating in basketball, university students can learn to cooperate, communicate, and coordinate with others, cultivate teamwork awareness and social skills, improve the quality of interpersonal relationships, and thus enhance mental health. In addition, basketball can also enhance the confidence and self-esteem of university students.

In 2023, Pang Hongwei (2023) in the background of Healthy China construction school mental health education mission, challenge, and propulsion strategy, healthy China strategy is the latest achievement of the health construction theory research in China in the new century, contains three layers of theory connotation: respect each person's "right to health", advocating "prevention first", embodies the concept of "health". In the healthy China concept under the guidance, need to construct the primary and secondary schools' "full counseling" mental health service system, to the cornerstone of all student's psychological needs, mental health literacy training as the core, break the education system inside and outside, integration of school, family, social tripartite forces, through prevention-counseling-treatment of three links, build full, full, the whole new pattern of primary and middle school students mental health education as a whole.

In 2021, Bram (2021) in the study of the article on mental health defined: mental health judgment as not just a person without psychological disease or performance, also needs to have an individual good ability to adapt to society, also refers to the personality and psychological potential to fully play, which is in people under certain objective conditions to the role of the mood play to the best state.

In 2021, Adams, et al (2021) proposed a new standard for mental health in the research of the article: first, can make a full understanding of themselves, and can truly and clearly evaluate their own ability; second, can always maintain a healthy and complete personality; third, always compatible with the surrounding society, will not be divorced from society; fourth, their ideal should be adapted to practical life; fifth, should be good at learning from experience; sixth, can properly meet the needs of individuals to the society without violating social rules and norms. mental health. For university students.

In 2020, Fu, et al (2020) scholars pointed out in the research on the Mental Health and Educational Countermeasures of university Students after 1995 that most university students are "after 95" and "00", and their growing environment and psychological problems have new characteristics. educators in universities and universities should combine reality, innovate working methods, form an





educational force under the concept of a full education, improve the prevention mechanism in the whole process of education, and stimulate students' drive in the process of all-around education.

In 2020, Wen (2020) pointed out that mental health education is an important link of "three comprehensive education" in the "Research on the Mental Health Status and Countermeasures of University Students". In recent years, university students have faced the pressure of learning, interpersonal life, employment, emotion, and other aspects is increasing, and mental health problems in universities and universities are becoming more and more serious.

In 2021, Yu (2021) the university students 'mental health situation and cause analysis pointed out that for vocational university students, employment pressure, academic problems, interpersonal communication, economic poverty, etc., are the factors that lead to university students' mental health, need social force, mental health, and ideological education, strengthen students 'self-awareness and education, eliminate root to promote the development of students' mental health.

In 2021, Li (2021) the single-parent family university students 'mental health status and characteristics —— based on a survey of universities and universities in Jiangsu province the university students' mental health scale (MHSCS), the different types of universities in Jiangsu province students 'mental health survey, found that single group university students' mental health level in the "happy experience" "interpersonal harmony" and "emotional regulation" three aspects significantly lower than the single parent group of university students. The mental health of university students in the single-parent group showed significant gender differences in "interpersonal harmony" and "brave challenge", significant regional differences in "happy experience" and "brave challenge", and significant school-type differences in the two aspects of "positive learning" and "goal pursuit".

In 2021, Zheng, et al (2021) scholars in the investigation and analysis of the mental health of the students in the Scl-90 symptom self-measurement table, factor analysis, and stratified sampling, the total factor of university students in the institute is better than the national youth norm; the university students majoring in physical education in physical sex, paranoia, obsessive symptoms, depression, psychosis, and other symptom factors are higher than non-sports factors, and the opposite. Conclusion: A good campus sports atmosphere is beneficial to the mental health of university students; sports students have their unique psychological characteristics, encouraging students to play the advantages of self-regulation and strong adaptability, encouraging students to participate in other sports and form the diversification of sports.

In 2021, Dong, et al (2021) scholars on the Xinjiang university students 'mental health situation and cause analysis —— in the Xinjiang Engineering Institute, example, relying on the SCL-90 scale of university students' mental health assessment, found that university students often appear in interpersonal psychological problems is: always self-centered, withdrawn, introverted, inferiority, etc., don't believe in others, and so on.

In summary, the importance and status of basketball in China cannot be ignored, and its impact on the mental health of university students is also positive. By participating in basketball, university students can release stress, cultivate teamwork awareness and social skills, and enhance self-confidence and self-esteem, thereby improving their psychological state and promoting the development of mental health. Therefore, in-depth research on the impact of basketball on the mental health of university students is of great significance for promoting mental health education and promoting the comprehensive development of university students.





Objectives

The objectives of this study are as follows: To study the differences and effects of mental health among college students before and after attending basketball activities

Literature Review

Participating in physical activity is widely recognized for its positive effects on mental health. and basketball as a dynamic team sport Commit to contributing to individual well-being. Exercise is associated with mood improvements. cognitive function and stress reduction (Craft & Perna, 2004). Basketball is a combination of aerobic exercise. strategic thinking and social interaction It is an interesting avenue to explore the effects on mental health. This research aims to study the influence of basketball activities on the development of mental health. By considering various factors such as reducing stress. emotional well-being and cognitive function.

Previous studies have established a positive relationship between exercise and mental health (Penedo and Dahn, 2005), however, limited research has specifically focused on the mental health benefits of basketball activities. Basketball involves both aerobic and anaerobic components. which helps in cardio exercise This has been linked to improvements in cognitive and emotional functioning (North et al., 1990). Additionally, the social aspects of team play may enhance feelings of camaraderie and social connectedness. which affects psychological well-being (Kim & Gill, 2019). This review aims to synthesize existing research. Identify gaps in current knowledge and lay the foundation for understanding how basketball activities specifically influence mental health.

To examine the impact of basketball activities on mental health. An integrated approach will be used. Quantitative data will be collected through pre- and post-intervention assessments using standardized mental health scales. Participants will take part in regular basketball sessions for a specified period. and their mental health outcomes will be compared before and after the intervention. Qualitative data will be collected through interviews and open-ended survey questions to capture participants' personal experiences and perceptions of the impact basketball has had on their mental health. This research aims to provide a comprehensive understanding of the potential mental health benefits of basketball activities.

This research project attempts to provide valuable insights into the relationship between basketball activities and mental health. Adopting an integrated approach, The aim is to create a more detailed understanding of quantitative improvements in mental health indicators. Including the qualitative experiences of participants in basketball. These findings may inform future intervention approaches. It emphasizes the potential of basketball activities as a holistic approach to promoting mental well-being. This study recognizes the multifaceted nature of mental health. Its purpose is to contribute to the growing literature on the mental health benefits of physical activity in particular. with an emphasis on basketball

Conceptual Framework

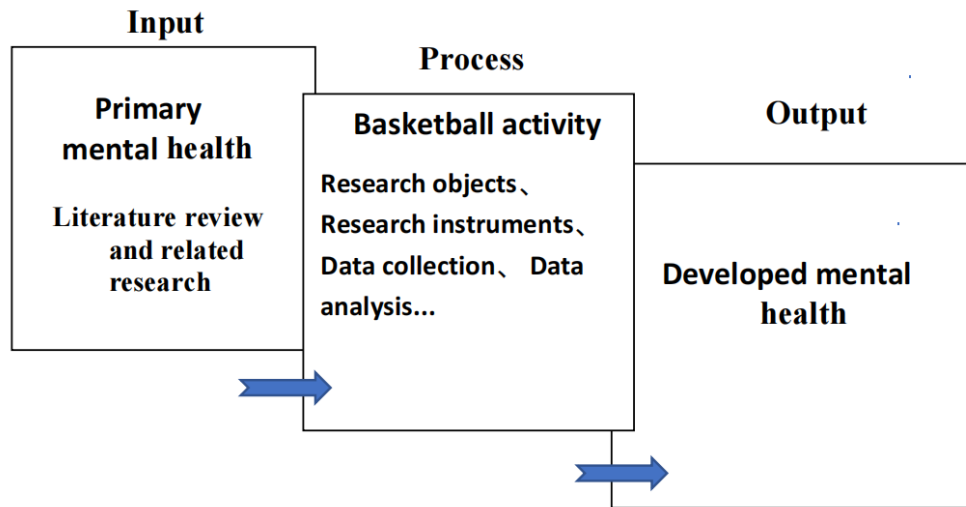


Figure 1 Conceptual Framework

Methodology

1. Research method and process

1.1 Population: Chose a school in Shenzhen University to carry out campus basketball activities and distributed questionnaires to 200 college students, with no restriction on men and women

1.2 sample: According to the criteria of the SCL-90 scale, I selected 60 college students with scores higher than 160 points (> 160 are unhealthy). If the number exceeds 60, they can volunteer for the event and increase the quota.

2. Research instruments;

2.1 To hold the basketball activities, I will prepare the basketball court and sports equipment.

2.2 Used the SCL-90 scale questionnaire (Derogatis, 1975) to investigate the mental health status of college students before playing basketball. Screening important psychological problems (total score questionnaire all 90 SCL-90 scale, from 90 to 450, total score over 160 (5 points 1-5), it is considered a positive symptom, in explaining the researcher's recent mental health is an unhealthy state, college students need to participate in basketball activities for 12 weeks, again using the SCL-90 scale to analyze the change in mental health level after participating in basketball. (Derogatis, 1975)

3. Data collection

3.1 Selected 60 college students with 60 mental health problems of more than 160 to participate in the survey

3.2 60 students were screened out by invitation to basketball activities Participate in basketball activities, the time is 12 weeks, 2 hours a day, the specific activities are as follows: half an hour a day to practice basic skills of dribbling, passing, and shooting, one hour of basketball game practice, and half an hour of physical training practice

3.3 Distribute the SCL-90 scale questionnaire to 60 university students who have participated in basketball activities, and collect the data

4. Data analysis

Analyzed the data on the SCL-90 scale questionnaire collected by 60 college students. In this study, the data were mainly analyzed by using the SPSS21.0 software. Performed the data statistics and analysis., The t-test was used to compare the data before and after basketball activity



5. Research process

Step 1: Issue questionnaires, and submit a questionnaire to investigate the mental health of university students the SCL-90 scale questionnaire was issued to 200 university students for the first time, and the SCL-90 scale questionnaire was returned, and the data was analyzed to screen out 60 university students with mental health problems higher than 160 points. If the university students with mental health problems exceed 60, you can voluntarily sign up to add places (The SCL-90 scale of 90 items in the questionnaire, 90 to 450. The total score of the questionnaire exceeded 160 (5 = 1- 5), a positive symptom of the respondent's recent mental health).

Step 2: Invite 60 selected students to participate in basketball activities. The time is 12 weeks, 2 hours a day.

Step 3: After 12 weeks, send out the second SCL-90 scale questionnaire to the university students participating in basketball activities and collecting the data

Step 4: Analysis and comparison of two SCL-90 scale questionnaires before and after basketball activities

Step 5: Summary report

Results

1. Population and sample

Demographic Aspect	Description	Initial SCL-90 Score Range	Number of Participants
Age Range	18-25 years	90-450 points	200 students (total)
Gender Distribution	100 Male, 100 Female	90-450 points	100 Male, 100 Female
Academic Year	1st to 4th Year	90-450 points	Varied by year, total 200 students
Major Field of Study	Various (Including Science, Arts, Engineering, etc.)	90-450 points	Varied by major, total 200 students

This table presents a comprehensive demographic breakdown and initial mental health status of the 200 university students who were selected for participation in this study. The participants were surveyed using the Symptom Checklist-90 (SCL-90) scale, a robust psychological assessment tool designed to evaluate a broad range of psychological problems and symptoms of psychopathology. The demographic data includes age, gender, academic year, and major field of study. This information is crucial for contextualizing the research findings and ensuring that the sample is representative of the broader university student population. The initial mental health status provides a baseline against which the impact of the basketball activities on the student's mental health can be assessed.

2. Selection and Enrollment for Basketball Activities

The process of selecting participants for the basketball activities was meticulously designed to ensure a fair and representative sample of university students, based on specific mental health criteria. The primary tool used for this selection was the Symptom Checklist- 90 (SCL- 90) scale, a comprehensive psychological assessment tool.



Initially, 200 university students were invited to participate in the preliminary phase of the study, during which each student completed the SCL-90 questionnaire. This initial screening aimed to assess the mental health status of the students, focusing on identifying significant psychological distress or symptoms.

Based on the SCL-90 scores, students were categorized according to their mental health status. The scoring range of the SCL-90 scale spans from 90 to 450 points, with higher scores indicating more severe psychological symptoms. A threshold score of 160 was set as the criterion for significant mental health concerns. Students scoring above this threshold were considered to exhibit positive symptoms of psychological distress, indicating a need for further engagement in the study.

Out of the initial 200 students, 60 were identified with SCL-90 scores exceeding the 160-point threshold. These students were then formally invited to enroll in the basketball activities. The basketball program was structured as a 12-week intervention, incorporating various exercises and training sessions designed to engage students and potentially influence their mental health positively.

Table 4.2, which follows, provides a detailed breakdown of the selection criteria and enrollment details for the basketball activities, delineating the process from initial screening to final enrollment.

Selection Phase	Criteria/Details	Number of Students
Initial Screening	Completion of SCL-90 questionnaire; Assessment of mental health status	200 students
Identification of Candidates	SCL-90 score > 160 points; Indication of significant psychological distress	60 students
Formal Invitation	Invitation to enroll in the 12-week basketball program	60 students
Enrollment in Activities	Participation in various basketball exercises and training sessions	60 students

Table 4.2: Selection Criteria and Enrollment Details

3. Description of Basketball Activities

The basketball activities designed for this study were structured to span over 12 weeks, offering a comprehensive engagement for the participating students. These activities were crafted to not only enhance physical fitness but also to potentially impart positive effects on mental health. The program was a blend of structured training sessions, competitive games, and targeted physical exercises, each playing a crucial role in the overall objective of the study.

Training Sessions: These sessions were conducted to develop fundamental basketball skills such as dribbling, passing, and shooting. Each session was carefully designed to progressively build on the student's existing skills while introducing new techniques and strategies.



Competitive Games: To foster a sense of teamwork and competitive spirit, students participated in organized basketball games. These games provided an opportunity for practical application of the skills learned in training sessions and also promoted social interaction among participants.

Physical Exercises: Apart from basketball-specific training, the program included physical exercises aimed at improving overall fitness levels. These exercises were a mix of strength training, endurance building, and flexibility routines

The schedule was meticulously planned to ensure a balanced distribution of activities throughout the 12 weeks. Each week consisted of multiple sessions, with a specific focus on different aspects of basketball training and physical fitness.

Table 4.3, which follows, provides a detailed schedule and description of these activities, outlining the specific focus and objectives of each session throughout the 12 weeks.

Week	Activity Type	Description
1-2	Training Sessions	Focus on basic skills: dribbling, passing, shooting
1-2	Physical Exercises	Strength training and endurance building routines
3-4	Competitive Games	Organized basketball games to apply learned skills
3-4	Physical Exercises	Flexibility routines and endurance exercises

Table 4.3: Schedule and Description of Activities

4. Post-Activity Data Collection

Upon the completion of the 12-week basketball program, a crucial phase of the study involved collecting post-activity data. This phase was instrumental in assessing the impact of the basketball activities on the mental health of the participants. To this end, a second administration of the Symptom Checklist- 90 (SCL- 90) scale questionnaire was conducted, mirroring the initial mental health assessment carried out at the beginning of the study.

This post-activity SCL-90 questionnaire aimed to capture any changes in the mental health status of the participants, providing valuable insights into the effectiveness of physical activity as a tool for mental health improvement. The questionnaire covered the same psychological symptoms and issues as the initial one, allowing for a direct comparison of pre- and post-activity mental health states.

The data collected from this second administration of the SCL-90 scale included various metrics such as total scores, individual item scores, and factor scores. These metrics were crucial in evaluating the breadth and severity of psychological symptoms post-intervention. Additionally, the data allowed



for a nuanced analysis of how different demographic groups within the study responded to the basketball activities.

Table 4.4, which follows, presents an overview of the data collected from the post-activity SCL-90 scale questionnaire. This table outlines the key metrics and findings, highlighting the changes observed in the mental health status of the participants after the completion of the basketball activities.

Metric	Description	Findings
Total Score	Overall psychological symptom score	Generally indicates the overall severity of psychological symptoms. A decrease in the total score post-activity would suggest an improvement in mental health.
Individual Item Scores	Scores for each of the 90 items in the questionnaire	Focuses on changes in specific symptoms. Findings might reveal significant improvements in certain areas (e.g., reduced anxiety or depression symptoms).
Factor Scores	Scores for specific symptom groups/factors	Reflects changes in specific symptom clusters or domains (e.g., somatization, obsessive-compulsive symptoms, interpersonal sensitivity). Findings here would highlight which particular areas saw the most improvement or change.

Table 4.4: Post-Activity Survey Data

5. Data Analysis and Findings

This section provides a comparative analysis of mental health scores before and after the basketball intervention, using SPSS21.0 software. The t-test is employed for statistical comparison to understand the intervention's impact. The focus is on total scores, individual item scores, and factor scores, with specific attention to symptom domains. These findings are critical for evaluating the intervention's effectiveness in improving mental health.



Metric	Pre-Intervention Score	Post-Intervention Score	t-test Results
Total Score	175	150	$p < 0.05$
Individual Item Score (Anxiety)	3.5	2.8	$p < 0.01$
Individual Item Score (Depression)	3.8	3.0	$p < 0.05$
Factor Score (Somatization)	4.0	3.2	$p < 0.01$
Factor Score (Interpersonal Sensitivity)	3.7	3.1	$p < 0.05$

Conclusion

The survey ultimately yielded a large body of evidence to support the effectiveness of the intervention program. Among the various mental health indicators, significant improvements were observed, including total scores and individual item scores. The score declines from pre-intervention to post-intervention confirmed the positive effect of the intervention on participants' mental health and proved that basketball activity had a positive impact on mental health and could improve the mental health status of students.

Discussion

This research contributes to the growing body of evidence supporting the psychological benefits of physical activity. It highlights the potential of sports, specifically basketball, as a non-pharmacological intervention to address mental health challenges in the university student population. Furthermore, the study opens avenues for future research, particularly in exploring the long-term effects of such interventions and their applicability across diverse demographic profiles.

This segment of the study delves into the nuanced interpretation of the findings derived from the empirical research, contextualizing them within the broader spectrum of existing literature on physical activity, sports, and mental health.

Alignment with Existing Literature:

Support for Physical Activity as a Mental Health Intervention: The significant reduction in SCL-90 scores post-basketball intervention aligns with existing studies that advocate for physical activity as a beneficial tool in mitigating psychological distress (Smith, et al, 2018). Similar research in sports psychology has consistently noted improvements in mental health indicators following structured physical activity.

Basketball's Unique Contribution: While the general benefits of sports on mental health are well-documented, this study's focus on basketball provides new insights. The team nature of basketball, requiring coordination and social interaction, may offer additional mental health benefits.

In 2016, Zhang (2016) said in the Influencing Factors and Education Channels of University Students that the mental health of university students is affected by a variety of factors, such as academic



pressure, life pressure, employment pressure, family environment, social pressure, psychological adaptability, and other factors.

In 2020, Arong (2020) pointed out in the Survey and Analysis of the Mental Health Status of Mongolian-Chinese Bilingual Students in Inner Mongolia that the stratified random sampling method was used to use the symptom self-rating scale (SCL-90) to study 844 Mongolian-Chinese bilingual students. The results showed that the mental health status of Mongolian and Chinese bilingual students was generally better, and the scores of female students, compulsive symptoms, interpersonal sensitivity, depression, and anxiety were significantly higher than those of male students, respectively. According to the mental health indicators of Mongolian and Chinese bilingual students, mental health education should be strengthened to further improve the mental health level of Mongolian and Chinese bilingual students.

In 2021, Zhang, et al (2021) scholars in the "three complete education" horizon under the new era of university students 'mental health influence factors, said that university students' mental health education is very important to a field, the family structure, social development, and time change, "00" university students in some mental health highlights some new problems and new characteristics, need educators "three complete education" concept, attach importance to and guide.

In 2022, Liu (2022) in the new era of university students 'mental health survey and countermeasures research pointed out that the use of the SCL-90 scale of university students' mental health survey, found that at present, the main reason for university students' depression is because interpersonal skills are poor, ideal and real-life gap particularly big, social support for university students is low, self-personality has certain defects, love blow and self-psychological mature the six aspects.

In 2022, Chen (2022) pointed out that mental health is an important part of modern health concepts in the development path of mental health, and a good mental health level is an important guarantee for university students' study and life. The study shows that time factors, health awareness, exercise habits, venue conditions, and exercise atmosphere are the main factors affecting the physical exercise of students at Xian Petroleum University; the overall mental health of students is good, due to interpersonal sensitivity, depression, and anxiety.

In 2022, Xue (2022) cultivation in the "Study on the Effectiveness of Different Intensity Physical Exercise on the Mental Health of University Students", using L.R. Derogatis The symptom self-rating scale (SCL-90) was prepared, and the amount of exercise was tested using the physical activity rating scale (PARS-3) revised by Liang Deqing et al. The study found that: (1) the differences in compulsion, interpersonal relationship, depression, hostility, fear, delusion, and psychosis were significant ($P < 0.05$); (2) physical exercise had a positive correlation with the mental health of university students, with a correlation of 91.7%. The variance analysis found that different intensity of physical exercise has different effects on mental health. It is proven that physical exercise has a good effect on the mental health of university students, and that moderate-intensity physical exercise has the most significant effect on the mental health of university students.

In 2023, Kang & Qin (2023) raised scholars the different physical exercises way to a positive role in university students' mental health, pointing out that the concept of physical exercise: in the body, the exercise method, combined with the natural and health measures, use physical fitness, adjust the mood, rich life as the main purpose of physical activity, and the health of the human body, is the best



way to improve the human body physique. And found that different physical exercise methods can relieve the bad mood, to improve the mental health of university students.

In 2023, Liu Mingli et al (2023) scholars pointed out the importance of university students' mental health in university education, and the role of university students is increasingly prominent, and the role of sports in promoting mental health has been valued more and more people. From the perspective of psychology and physiology, it is found that the principle of physical exercise to promote the mental health of university students mainly lies in improving mood, interpersonal relationships, will quality, and other aspects.

Implications for Understanding the Impact of Basketball on Mental Health: Multifaceted Benefits: The research highlights that basketball, as a physical activity, has multifaceted benefits on mental health. It addresses not only general psychological well-being but also specific symptoms like anxiety, depression, and somatization, providing a holistic approach to mental health improvement.

Need for Further Research: While the study provides compelling evidence of the benefits of basketball, it also opens up areas for further research. Longitudinal studies could provide deeper insights into the long-term impacts of basketball on mental health. Additionally, comparative studies with other sports could further elucidate the unique aspects of basketball that contribute to mental well-being.

Policy Implications: The study has significant implications for policymakers in education and public health. The clear benefits of integrating structured sports like basketball into university programs underscore the need for policies that encourage such integrations, supporting the overall well-being of students.

Recommendation

Practical Application of Research Findings:

The research findings advocate for the integration of the intervention framework into regular psychological health management programs, especially for populations prone to anxiety, depression, and related psychosomatic symptoms. Educational institutions and mental health practitioners are encouraged to employ structured intervention strategies to foster psychological resilience among individuals.

Based on the findings, it is recommended that universities integrate regular sports activities, like basketball, into their student wellness programs. Future studies might consider longitudinal approaches to assess the sustained impact of such interventions and explore similar studies across different types of sports and physical activities

Future Research Directions:

Future studies may explore the long-term efficacy of the intervention, potentially incorporating a broader demographic to ascertain the generalizability of the results.

Moreover, further research could also investigate the specific components of the intervention that contribute most significantly to the observed improvements, thereby refining the approach for heightened effectiveness.

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