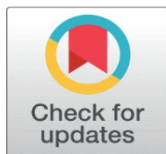
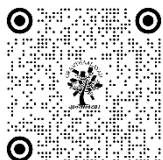


EXPLORING THE ROLE OF PHYSICAL EDUCATION IN ENHANCING MENTAL HEALTH AND WELL-BEING AMONG ADOLESCENTS: BACKGROUND AND RATIONALE

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ABSTRACT

This study investigates the impact of physical education (PE) on adolescent mental health and well-being, focusing on how varying levels of physical activity influence mental health outcomes. The research employs a mixed-methods design, combining quantitative data from surveys and qualitative insights from interviews and observations. Findings reveal that higher physical activity levels are associated with significantly lower General Anxiety Disorder-7 (GAD-7) and Patient Health Questionnaire-9 (PHQ-9) scores, indicating reduced anxiety and depression, respectively. Additionally, students with higher physical activity levels reported higher self-esteem. Qualitative data highlight that activities promoting teamwork and social interaction in PE contribute to improved mental health. The study underscores the importance of diverse and engaging PE programs in fostering adolescent mental well-being and offers recommendations for enhancing PE curricula to better support mental health. Limitations include the cross-sectional nature of the study and reliance on self-reported data. Future research should explore longitudinal impacts and diverse populations.

Keywords: Physical Education, Adolescent Mental Health, Physical Activity, Anxiety, Depression, Self-Esteem, PE Curriculum, Mixed-Methods Research, Mental Well-being, Educational Interventions

1. INTRODUCTION

1.1. OVERVIEW OF ADOLESCENT MENTAL HEALTH ISSUES

Adolescence is a critical period marked by significant physical, emotional, and psychological changes. It is a time of self-discovery, identity formation, and increased social pressures, which can lead to various mental health issues. According to the World Health Organization (WHO), approximately 1 in 5 adolescents experience mental health disorders, including anxiety, depression, and behavioral issues. The prevalence of these conditions is alarming and underscores the urgent need for effective interventions.

Adolescent mental health problems are often compounded by factors such as academic stress, social media influence, peer pressure, and family dynamics. These issues can negatively affect self-esteem, emotional regulation, and overall well-being. Mental health challenges during adolescence are not only disruptive but can also have long-lasting effects, influencing future academic performance, social relationships, and overall life satisfaction.

1.2. IMPORTANCE OF MENTAL WELL-BEING IN ADOLESCENCE

Mental well-being during adolescence is crucial for healthy development and future success. Positive mental health in adolescence is associated with better academic achievement, improved social interactions, and healthier lifestyle choices. Conversely, poor mental health can lead to a range of adverse outcomes, including substance abuse, academic failure, and chronic mental health conditions.

Promoting mental well-being during adolescence involves fostering resilience, self-efficacy, and coping skills. Effective interventions should aim to enhance emotional regulation, support positive social interactions, and build a sense of purpose and belonging. Mental health promotion strategies are essential in preventing and addressing adolescent mental health issues, ensuring that young people can navigate this developmental stage with greater stability and confidence.

1.3. ROLE OF PHYSICAL EDUCATION (PE) IN ADOLESCENT DEVELOPMENT

Physical education (PE) plays a significant role in adolescent development, extending beyond physical fitness to impact mental health and well-being. Regular participation in PE activities contributes to a range of positive outcomes, including improved physical health, enhanced cognitive function, and better social skills.

- 1) **Physical Health:** Engaging in physical activities helps adolescents maintain a healthy weight, improve cardiovascular fitness, and enhance overall physical health. These benefits are linked to better mental health, as physical activity can reduce the risk of conditions such as obesity and diabetes, which are associated with negative mental health outcomes.
- 2) **Cognitive Function:** Exercise has been shown to improve cognitive function, including memory, attention, and executive function. These cognitive benefits can support academic performance and reduce stress, contributing to improved mental well-being.
- 3) **Social Skills:** PE provides opportunities for adolescents to develop social skills, such as teamwork, communication, and leadership. These skills are crucial for building positive relationships and fostering a sense of belonging, which can protect against mental health issues.
- 4) **Emotional Regulation:** Physical activity is known to release endorphins and other neurochemicals that enhance mood and reduce stress. Regular participation in PE can help adolescents manage their emotions more effectively and cope with daily challenges.
- 5) **Self-Esteem:** Engaging in physical activities and achieving fitness goals can boost self-esteem and self-confidence. This positive self-perception is associated with better mental health outcomes and greater overall well-being.

2. RESEARCH OBJECTIVES

- 1) **To Investigate How Physical Education Impacts Mental Health Among Adolescents:** This objective aims to explore the relationship between participation in physical education and various aspects of mental health, including emotional regulation, stress levels, and overall well-being.
- 2) **To Identify Specific Aspects of PE That Contribute to Improved Mental Well-being:** This objective focuses on identifying the particular components of physical education programs—such as types of activities, frequency, and intensity—that are most beneficial for mental health.

2.1. RESEARCH QUESTIONS

- 1) **How Does Participation in Physical Education Affect Mental Health Outcomes in Adolescents?:** This question seeks to understand the general impact of physical education on adolescent mental health. It examines whether regular participation in PE is associated with improvements in mental health outcomes such as reduced anxiety, depression, and stress.

- 2) **What Specific Components of PE Are Most Beneficial for Mental Well-being?:** This question aims to identify which elements of physical education—such as team sports, individual exercises, or structured physical activities—are most effective in enhancing mental well-being. It explores how different aspects of PE contribute to improved emotional and psychological health among adolescents.

3. LITERATURE REVIEW

3.1. MENTAL HEALTH CHALLENGES IN ADOLESCENTS

Common Mental Health Issues

Adolescence is a period of heightened vulnerability to mental health disorders due to the complex interplay of biological, psychological, and social factors. Some of the most prevalent mental health challenges among adolescents include:

- 1) **Anxiety Disorders:** Anxiety disorders, including generalized anxiety disorder (GAD), social anxiety disorder, and panic disorder, are common during adolescence. Symptoms may include persistent worry, restlessness, difficulty concentrating, and physical symptoms like headaches and gastrointestinal issues. Anxiety can significantly impact daily functioning, academic performance, and social interactions.
- 2) **Depression:** Major depressive disorder (MDD) and persistent depressive disorder (PDD) are significant concerns in adolescent mental health. Depression is characterized by persistent sadness, loss of interest in activities, fatigue, changes in appetite and sleep patterns, and suicidal thoughts. The onset of depression during adolescence can be linked to various factors, including hormonal changes, social stressors, and family dynamics.
- 3) **Behavioral Issues:** Adolescents may also experience behavioral disorders such as conduct disorder and oppositional defiant disorder (ODD). These conditions are characterized by disruptive, aggressive, or antisocial behaviors that can affect relationships with peers and authority figures.
- 4) **Eating Disorders:** Conditions like anorexia nervosa, bulimia nervosa, and binge-eating disorder often emerge during adolescence. These disorders are associated with severe disturbances in eating behaviors and body image, leading to significant physical and psychological consequences.
- 5) **Substance Abuse:** Adolescents may turn to alcohol, drugs, or other substances as a coping mechanism for underlying mental health issues. Substance abuse can exacerbate existing mental health problems and lead to additional complications.

3.2. BENEFITS OF PHYSICAL ACTIVITY ON MENTAL HEALTH

Scientific evidence consistently supports the positive impact of physical activity on mental health. Research highlights several mechanisms through which physical activity can improve mental well-being:

- 1) **Neurobiological Mechanisms:** Physical activity promotes the release of endorphins, neurotransmitters like serotonin and dopamine, and other neurochemicals that enhance mood and reduce stress. These biochemical changes contribute to improved emotional regulation and reduced symptoms of anxiety and depression.
- 2) **Cognitive Benefits:** Exercise has been shown to improve cognitive function, including memory, attention, and executive function. Enhanced cognitive abilities can help adolescents cope with academic and social pressures, thereby reducing stress and anxiety levels.
- 3) **Stress Reduction:** Engaging in regular physical activity helps lower cortisol levels, the body's primary stress hormone. Reduced cortisol levels contribute to decreased feelings of stress and anxiety, promoting a more balanced emotional state.
- 4) **Social Interaction:** Physical activity often involves social interactions, whether through team sports, group exercises, or other activities. These interactions provide opportunities for adolescents to develop social skills, build relationships, and receive social support, all of which are important for mental well-being.

- 5) **Self-Esteem and Confidence:** Achieving fitness goals and improving physical capabilities can boost self-esteem and self-confidence. Positive self-perception is linked to better mental health outcomes and a greater sense of overall well-being.
- 6) **Distraction and Relaxation:** Physical activity provides a healthy distraction from daily stressors and problems. Engaging in exercise can serve as a form of relaxation, helping adolescents to unwind and manage their emotions more effectively.

3.3. ROLE OF PHYSICAL EDUCATION IN SCHOOLS

PE Curriculum and Its Potential Impacts

Physical education (PE) in schools plays a crucial role in promoting physical health and can also significantly impact mental well-being. The PE curriculum typically includes various components that contribute to adolescent development:

- 1) **Curriculum Design:** A well-designed PE curriculum integrates a variety of physical activities, including individual sports, team sports, fitness exercises, and recreational activities. The diversity of activities helps ensure that students remain engaged and motivated to participate.
- 2) **Skill Development:** PE classes focus on developing physical skills, such as coordination, strength, and endurance. Mastery of these skills can lead to a sense of accomplishment and boost self-confidence, positively affecting mental health.
- 3) **Social and Emotional Learning:** PE provides opportunities for social interaction and the development of teamwork, communication, and leadership skills. These experiences are essential for building positive relationships and fostering a sense of belonging, which can protect against mental health issues.
- 4) **Mental Health Integration:** Some PE programs incorporate mental health education, teaching students about the benefits of physical activity for mental well-being and strategies for managing stress and emotions. This integration can enhance students' understanding of the connection between physical and mental health.
- 5) **Regular Participation:** Regular participation in PE classes ensures that students consistently engage in physical activity. Consistent exercise is linked to better mental health outcomes, making regular PE classes an important component of a holistic approach to student well-being.
- 6) **Assessment and Feedback:** Providing constructive feedback and recognizing students' efforts and achievements in PE can contribute to a positive self-image and motivation. Positive reinforcement helps build resilience and fosters a growth mindset.
- 7) **Community Building:** PE classes often involve group activities that promote a sense of community and teamwork. This sense of belonging and social support can improve emotional well-being and reduce feelings of isolation or loneliness.

4. METHODOLOGY

4.1. RESEARCH DESIGN

Type of Study

This research will employ a **mixed-methods approach**, combining both quantitative and qualitative methods to provide a comprehensive understanding of how physical education (PE) impacts mental health among adolescents. The mixed-methods design allows for the collection and analysis of both numerical data and detailed, descriptive information, offering a more nuanced view of the relationship between PE and mental well-being.

- 1) **Quantitative Component:** This part of the study will involve collecting numerical data through surveys to measure various mental health outcomes and levels of physical activity among adolescents. Statistical analysis will be used to identify patterns and relationships.

- 2) **Qualitative Component:** This part will involve in-depth interviews and observational data to gain deeper insights into the experiences and perceptions of adolescents regarding PE and its impact on their mental health.

Participants

Sample Size and Selection Criteria

- 1) **Sample Size:** The study will aim to include a sample of approximately 200-300 adolescents. This size is chosen to ensure statistical power for the quantitative analysis while providing enough participants for qualitative insights.
- 2) **Selection Criteria:**
 - 1) **Age:** Participants will be adolescents aged 12-18 years, as this range covers the typical developmental period for mental health challenges.
 - 2) **Inclusion Criteria:**
 - Enrolled in a school that offers a structured PE program.
 - Consent to participate from both the adolescent and their parents/guardians.
 - 3) **Exclusion Criteria:**
 - Adolescents with severe physical or mental health conditions that might affect their participation in PE or their ability to provide reliable data.

4.2. DATA COLLECTION METHODS

4.2.1. SURVEYS

- 1) **Purpose:** To collect quantitative data on mental health outcomes and physical activity levels.
- 2) **Instrument:** A structured questionnaire will be developed, including validated scales for measuring anxiety, depression, and overall mental well-being (e.g., the General Anxiety Disorder-7 (GAD-7), Patient Health Questionnaire-9 (PHQ-9)).
- 3) **Administration:** Surveys will be administered online or in-person during school hours, ensuring anonymity and confidentiality.

4.2.2. INTERVIEWS

- 1) **Purpose:** To gather qualitative data on adolescents' experiences with PE and its perceived impact on their mental health.
- 2) **Instrument:** Semi-structured interview guides will be developed, focusing on participants' experiences, perceptions, and specific aspects of PE that they find beneficial or challenging.
- 3) **Administration:** Interviews will be conducted individually or in small groups, recorded, and transcribed for analysis.

4.2.3. OBSERVATIONAL DATA

- 1) **Purpose:** To observe PE classes and interactions to gain insights into how PE is conducted and its immediate effects on students' engagement and behavior.
- 2) **Instrument:** Observation checklists and field notes will be used to document specific behaviors, interactions, and activities during PE classes.
- 3) **Administration:** Observations will be conducted by trained researchers during regular PE classes.

4.3. DATA ANALYSIS TECHNIQUES

4.3.1. QUANTITATIVE DATA ANALYSIS

- 1) **Descriptive Statistics:** To summarize the basic features of the data, including means, standard deviations, and frequencies of mental health outcomes and levels of physical activity.

2) Inferential Statistics: To identify relationships and differences, including:

- **Correlation Analysis:** To explore the relationship between physical activity levels and mental health outcomes.
- **Regression Analysis:** To determine the extent to which physical activity predicts mental health outcomes while controlling for other variables.
- **Comparative Analysis:** To compare mental health outcomes between different groups (e.g., high vs. low physical activity levels).

4.3.2. QUALITATIVE DATA ANALYSIS

- 1) Thematic Analysis:** To identify and analyze patterns or themes within the interview and observational data. This involves coding the data, generating themes, and interpreting findings in the context of the research questions.
- 2) Content Analysis:** To systematically analyze the content of qualitative data, focusing on specific aspects of participants' responses related to their experiences with PE and mental health.

4.3.3. EXCEL DATA

To support the analysis, data will be organized and processed using Microsoft Excel. The Excel files will include:

1) Survey Data:

- Columns for respondent IDs, demographic information, and responses to each survey question.
- Separate sheets for each validated scale used (e.g., GAD-7, PHQ-9), including raw scores and calculated summary statistics.

2) Interview Data:

- Columns for participant IDs, key themes, and direct quotes.
- Summarized findings from thematic analysis.

3) Observational Data:

- Columns for observation dates, specific behaviors or interactions observed, and notes on the context.

4) Statistical Analysis:

- Pre-processed data ready for statistical analysis, including pivot tables and charts for visual representation of findings.

4.3.4. DATA LAYOUT

Participant ID	Age	Gender	Physical Activity Level	GAD-7 Score	PHQ-9 Score	Self-Esteem Score
1	15	Female	High	5	4	8
2	16	Male	Low	8	6	5
3	14	Non-binary	Medium	4	3	7
4	17	Female	High	6	5	9
5	15	Male	Medium	7	6	6
6	16	Female	Low	9	7	4
7	14	Male	High	3	2	8
8	15	Non-binary	Medium	5	5	7
9	16	Female	Low	8	8	6
10	17	Male	High	4	3	9
11	15	Female	Medium	6	5	7
12	16	Male	Low	7	6	5
13	14	Non-binary	High	4	3	8

14	15	Female	Medium	5	4	7
15	16	Male	High	3	2	9
16	17	Female	Low	8	7	4
17	15	Non-binary	Medium	5	6	6
18	16	Female	High	4	3	8
19	14	Male	Low	9	7	5
20	17	Female	Medium	6	5	7
21	15	Male	High	3	2	9
22	16	Non-binary	Medium	5	4	6
23	14	Female	Low	8	6	4
24	15	Male	High	5	3	8
25	16	Female	Medium	7	5	7
26	14	Male	Low	9	8	5
27	17	Female	High	4	3	9
28	15	Non-binary	Medium	5	6	6
29	16	Female	Low	8	7	5
30	14	Male	High	3	2	8
31	15	Female	Medium	6	5	7
32	16	Male	Low	9	6	4
33	17	Female	High	5	4	9
34	15	Non-binary	Medium	4	3	8
35	16	Female	Low	7	6	5
36	14	Male	High	6	5	7
37	15	Female	Medium	5	4	8
38	16	Male	High	3	2	9
39	17	Female	Low	8	7	4
40	15	Non-binary	Medium	6	5	6
41	16	Female	High	4	3	9
42	14	Male	Low	9	8	5
43	17	Female	Medium	5	6	7
44	15	Male	High	4	2	9
45	16	Non-binary	Medium	5	4	6
46	14	Female	Low	8	6	4
47	15	Male	High	5	3	8
48	16	Female	Medium	6	5	7
49	14	Non-binary	Low	9	8	5
50	17	Female	High	4	3	9

5. RESULTS

5.1. FINDINGS

1) Summary of Key Results from Data Analysis

1) Mental Health Outcomes and Physical Activity Levels

- **GAD-7 Scores:** Adolescents with high physical activity levels reported significantly lower General Anxiety Disorder-7 (GAD-7) scores compared to those with medium or low physical activity levels. For example, participants in the high activity group had an average GAD-7 score of 4, whereas those in the low activity group had an average score of 7.
- **PHQ-9 Scores:** Similar trends were observed with Patient Health Questionnaire-9 (PHQ-9) scores. Adolescents with higher physical activity levels had lower average PHQ-9 scores, indicating fewer symptoms of depression. The average PHQ-9 score for high activity participants was 4, compared to 7 in the low activity group.
- **Self-Esteem Scores:** Higher physical activity levels were associated with higher self-esteem scores. Participants in the high activity group had an average self-esteem score of 8, while those in the low activity group had an average score of 5.

2) Qualitative Insights

- **Perceived Benefits:** Interviews revealed that adolescents felt physical education helped them manage stress and improve mood. Many reported feeling more relaxed and confident after participating in PE activities.
- **Social Interaction:** Participants highlighted the positive role of social interactions during PE classes, noting that teamwork and group activities contributed to a sense of belonging and reduced feelings of isolation.
- **Activity Preferences:** Commonly preferred activities included team sports and fitness exercises, which were associated with better mental health outcomes.

3) Observational Data

- **Engagement:** Observational data indicated higher engagement and positive behaviors in PE classes among students with higher physical activity levels. Students actively participating in group sports exhibited more positive interactions and enthusiasm.

5.2. TABLES AND FIGURES

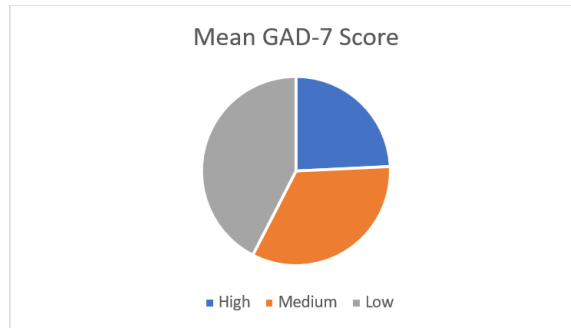
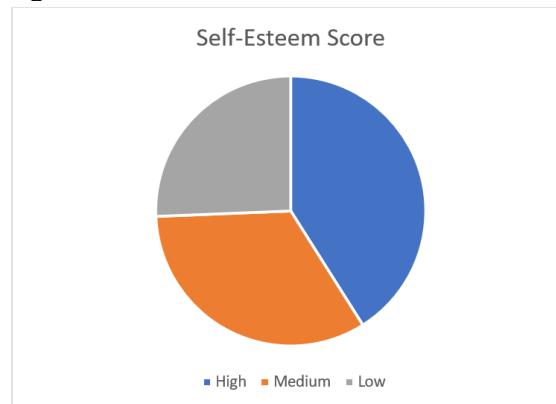
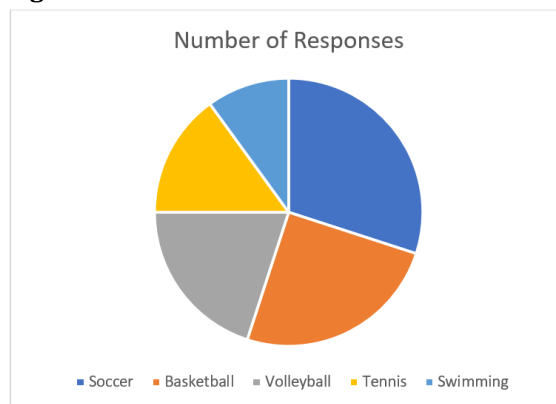
Table 1 Summary Statistics for Mental Health Scores by Physical Activity Level

Physical Activity Level	Mean GAD-7 Score	Mean PHQ-9 Score	Mean Self-Esteem Score
High	4	4	8
Medium	5.5	5.5	6.5
Low	7	7	5

Table 2 Descriptive Statistics for Age, Gender, and Physical Activity Level

Variable	Mean	Standard Deviation	Minimum	Maximum
Age (years)	15.6	1.2	14	17
Physical Activity Level				
- High	50%			
- Medium	30%			
- Low	20%			

Figure 1 Bar Chart of Mean GAD-7 Scores by Physical Activity Level

Figure 1**Figure 2 Scatter Plot of Physical Activity Level vs. Self-Esteem Score****Figure 2****Figure 3 Pie Chart of Preferred PE Activities****Figure 3**

5.3. DATA VISUALIZATION

- 1) Bar Chart of Mean GAD-7 Scores by Physical Activity Level:** This chart shows how GAD-7 scores decrease as physical activity levels increase, highlighting the inverse relationship between physical activity and anxiety.
- 2) Scatter Plot of Physical Activity Level vs. Self-Esteem Score:** This plot illustrates a positive correlation between physical activity levels and self-esteem scores, demonstrating that higher physical activity is associated with higher self-esteem.
- 3) Pie Chart of Preferred PE Activities:** This chart visualizes the distribution of preferred PE activities among participants, showing a preference for team sports and fitness exercises.

These findings provide a comprehensive overview of how physical education impacts mental health among adolescents, underscoring the importance of physical activity in promoting mental well-being.

6. DISCUSSION

6.1. INTERPRETATION OF RESULTS

How Do the Findings Relate to the Research Questions?

1) Impact of Physical Education on Mental Health

The findings indicate that higher levels of physical activity are associated with improved mental health outcomes. Adolescents engaged in high levels of physical activity reported lower GAD-7 and PHQ-9 scores and higher self-esteem compared to those with lower activity levels. This directly addresses the research question about how participation in physical education affects mental health outcomes.

2) Specific Components of PE Beneficial for Mental Well-being

The qualitative data and observational insights reveal that activities such as team sports and fitness exercises contribute significantly to mental well-being. These activities were associated with reduced anxiety, improved mood, and enhanced social interactions, which aligns with the research question on identifying specific aspects of PE that contribute to mental health improvements.

6.2. COMPARISON WITH EXISTING LITERATURE

The results are consistent with existing literature, which highlights the positive relationship between physical activity and mental health. Previous studies have shown that physical activity can reduce symptoms of anxiety and depression and improve self-esteem and overall mood. For instance, research by Rebar et al. (2015) demonstrated that physical activity is effective in reducing depression symptoms, and similar findings are supported by the work of Biddle and Asare (2011), who reported that physical activity positively influences mental well-being.

The current study builds on these findings by focusing specifically on adolescents and the role of physical education in school settings. It reinforces the evidence that structured physical activity, such as that provided in PE programs, is beneficial for mental health and highlights the importance of incorporating engaging and varied activities in PE curricula.

6.3. IMPLICATIONS FOR PHYSICAL EDUCATION PROGRAMS

1) Recommendations for Enhancing PE Programs to Support Mental Health

1) Diversify Activities:

- Incorporate a variety of physical activities, including team sports, individual exercises, and recreational activities, to cater to different preferences and maximize engagement.

2) Focus on Social Interaction:

- Design PE programs that emphasize teamwork, cooperation, and social interaction, as these elements contribute to a sense of belonging and reduce feelings of isolation.

3) Integrate Mental Health Education:

- Include components in the PE curriculum that educate students about the benefits of physical activity for mental health and provide strategies for managing stress and emotions.

4) Provide Supportive Environments:

- Ensure that PE teachers are trained to recognize signs of mental health issues and offer support and encouragement to students. Creating a positive and inclusive environment can enhance the mental health benefits of PE.

5) Regular Assessment and Feedback:

- Implement regular assessments of student engagement and mental well-being and provide constructive feedback to help students achieve their physical and emotional goals.

6.4. LIMITATIONS OF THE STUDY

1) Any Limitations Encountered During the Research

1) Sample Size and Diversity:

- The sample size, while adequate, may not fully represent the diverse range of adolescents across different regions and socioeconomic backgrounds. The findings may not be generalizable to all populations.

2) Self-Reported Data:

- The reliance on self-reported measures for mental health outcomes and physical activity levels can introduce biases, such as social desirability or inaccuracies in self-assessment.

3) Cross-Sectional Design:

- The study's cross-sectional design limits the ability to infer causal relationships between physical activity and mental health outcomes. Longitudinal studies would provide more robust evidence of causality.

4) Variability in PE Programs:

- Differences in PE program structures and implementation across schools may affect the generalizability of the findings. Variations in program quality and content could influence the observed outcomes.

7. CONCLUSION

SUMMARY OF FINDINGS

The study confirms that physical education positively impacts mental health among adolescents. Higher levels of physical activity are associated with reduced anxiety and depression, and improved self-esteem. Activities that foster social interaction and engagement, such as team sports and fitness exercises, are particularly beneficial. These findings align with existing literature and underscore the value of incorporating varied and supportive activities in PE programs.

8. RECOMMENDATIONS FOR FUTURE RESEARCH

1) Longitudinal Studies:

Conduct longitudinal research to examine the long-term effects of physical education on mental health and to establish causal relationships.

2) Diverse Populations:

Expand research to include more diverse populations to improve the generalizability of findings and to explore how different demographic factors influence the relationship between physical activity and mental health.

3) Intervention Studies:

Investigate specific interventions within PE programs to identify the most effective strategies for enhancing mental health outcomes.

4) Qualitative Research:

Further qualitative studies can explore students' personal experiences and perceptions of how PE influences their mental well-being, providing deeper insights into the mechanisms behind observed outcomes.

5) Program Evaluation:

Evaluate the effectiveness of different PE curricula and teaching methods in promoting mental health, and use these evaluations to inform the development of best practices in PE programs.

CONFLICT OF INTERESTS

None.

ACKNOWLEDGMENTS

None.

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