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Sports Participation and Depressive Symptoms in Youth: Demographic Differences

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ABSTRACT

Background: Youth emerge as an essential period in forming lifelong health and well-being. During adolescence, physical activity (PA) improves cardiovascular health, fitness levels, and the prevention of chronic illnesses, and the positive effect is also extended to the mental realm, as PA reduces symptoms of anxiety and depression. Therefore, the current study aims to enhance our understanding of the correlation between sports participation and depressive symptoms. Additionally, it seeks to explore how demographics such as gender, age, and race can shape these connections. **Methods:** The research sample was established by utilising the U.S. Youth Risk Behavior Surveillance (YRBS) 2019 cycle, and the eligible samples from this cycle were included in the current study. A self-administered survey evaluated sports participation, categorized as Zero, one, two, three, or more teams. This study included 16,104 participants and conducted self-reported questionnaires on gender, grade, race/ethnicity, and depressive symptoms. The study had a nationally representative population of American students in Grades 10 to 12 (aged 14–17 years). **Results:** A total of 7843 females and 8261 males, distributed across age groups (14 years old, 15 years old, 16 years old, and 17 years old), with the numbers 3430, 4445, 4300, and 3929, respectively. Overall, there was a negative correlation between sports participation and feelings of sadness (a symptom of depression) among the subjects. This significant relationship between participating in sports teams and experiencing sadness was dose dependent. **Conclusion:** Youth with more team sports participation is likely to display lower depression symptoms, and differences in demographic factors such as gender, race, and age are detected. Physical activity research is responsible for attending to social equity issues and fostering inclusiveness, particularly concerning different gender and ethnic groups.

KEYWORDS

Sport participation; depressive; youth; youth risk behavior surveillance; race

Introduction

Growth and changes are experienced during adolescence, which lasts from 10 years to 19 years [1–4]. This critical time is characterised by dynamic physiological, emotional, and cognitive changes, which establish the basis of future life [5]. Adolescence is more than a phase; it is recognised as an entry to adulthood where people seek their identity, societal roles, and what they aspire for in life [6]. Health

and habits formed during this period usually determine the path to lifetime wellness. It is a time when adolescents discover themselves, relate with others, and face societal expectations [7]. Understanding the complexities of adolescence is critical because it presents chances to create healthy habits and mental health that echo throughout one's lifetime journey [8].

Consistent engagement in physical activity (PA) offers numerous health advantages, including enhanced muscular



and cardio-respiratory fitness, as well as healthy bone development [9–11], improved well-being (e.g., self-perception, self-esteem, and happiness), and reduced incidence of ill-being (e.g., depression, anxiety, stress) [12]. The World Health Organization (WHO) recommends that adolescents engage in at least 60 min of moderate to vigorous-intensity physical activity daily [13,14]. During adolescence, PA improves cardiovascular health, better fitness levels, and the prevention of chronic illnesses [15,16]. The positive effect is also extended to the mental realm, as PA serves to reduce symptoms of anxiety and depression. They are also psychologically beneficial, improving mood, self-esteem, and general emotional well-being [17]. Additionally, sports and other physical activities are significant for developing vital life skills such as teamwork, discipline, and perseverance [18,19]. These experiences are very formative and do not affect just health outcomes at that moment but make a foundation for a healthy, active lifestyle in the future [20]. Hence, promoting and encouraging physical activity amongst youth to foster their overall well-being cannot be underestimated.

Sports participation entails students proactively joining in sports activities, serving as a comprehensive depiction of sports objectives [21]. Sports participation involves achieving success and investing mental energy, and students' energy in activities fluctuates based on time and goals [22,23]. More importantly, adolescent sports participation highlights complex relationships between sport participation and mental health [24–26]. It is important to note that the benefits of physical health and increased cardiovascular fitness levels in sports participation go beyond that. They help to nurture youth's mental well-being. Participation in sports regularly has been found to decrease symptoms of anxiety and depression, raise mood, and improve self-esteem [27]. Various mechanisms lead to this positive impact. Endorphins, which are natural mood enhancers, are released by PA, thereby leading to an individual's overall happiness [2,28]. Additionally, sports participation is a communal activity that leads to social ties and social support systems, two crucial elements of mental health. Involvement in a sports team is a need that caters to social interaction and affiliation; in other words, it is a basic need [29]. Team sport enhance teamwork, communication, and resilience—which are essential for sports excellence and personal well-being [30]. Sports participation is more than exercise; the holistic approach affects the youth's mental health, giving them a channel for their social development and healthy emotions [31].

A detailed look into the complex relationship between demographic disparities, sporting activities & depressive tendencies reveals a rather complex relationship that needs to be thoroughly examined. The mental health effects of sports engagement depend on a significant demographic factor—gender [32,33]. Research shows that the impact of sports participation on one's mental health may differ between genders. Societal expectations, roles, and responsibilities partly influence the mental health benefits of sports. Furthermore, socioeconomic status, a key determinant of access, also contributes to a complex tapestry of sports mental health outcomes [33,34]. Youth from

different socioeconomic backgrounds may face specific challenges and resources causing stress as their sport [35]. Socioeconomic micro-factors interacting with exposure experiences downstream, affecting the prevalence and severity of depressive symptoms, are essential to get things done with targeted interventions that meet the unique needs of different young people [33]. Parental education, the other demographic factor, creates new mobility factors. Liang et al. [5] discuss the effects of adolescent sports engagement and mental health outcomes associated with parental educational attainment.

To determine treatment, it is crucial to comprehend how variables like gender, socioeconomic status, and education can influence both sports participation and depressive symptoms. Further investigation is required in this area. This study has two objectives. Firstly, it aims to enhance our understanding of the correlation between sports participation and depressive symptoms. Additionally, it seeks to explore how demographics such as gender, age, and race can shape these connections. By delving into these intricacies, the study hopes to provide insights that can assist in developing therapies catering to the unique characteristics of the adolescent population. Ultimately, this research offers guidance for programs and services supporting health by incorporating sports participation while addressing needs within different adolescent demographic groups. While the benefits of physical activity, particularly sports participation, are well documented, understanding the role of demographic differences in the relationship between sports participation and mental health is an essential strategy for the research method.

Method

Study design and participants

The Youth Risk Behavior Surveillance (YRBS) project, initiated in 1990 and conducted biennially, is a national survey assessing health-related behaviors of 9th to 12th-grade students in the United States. This study uses data from the 2019 survey, which employed a multistage cluster sampling design to ensure nationally representative results. The 2019 YRBS survey sampled 21,791 students, with 17,232 usable questionnaires after data editing, resulting in an overall response rate of 57.5%. The dataset used in this study includes 16,104 eligible participants, selected from public, Catholic, and other private schools in Grades 9 through 12 across the 50 states and the District of Columbia. Eligibility was determined based on the student's enrollment in these grades and their attendance in the sampled schools during the survey period. Ethical approval and informed consent are required for experiments involving human subjects. The study was approved by the Ethics Committee at Soochow University (SUDA20240626H06). All participants signed the informed consent in this study.

Measures

Demographic Information-Participants provided data through a self-administered questionnaire, including essential details such as gender (female or male), academic grade (9, 10, 11, and 12), and ethnicity/race (Black/African

American, White, Latino/Hispanic, or other). Furthermore, participants disclosed body height and weight information, facilitating the computation of body mass index (BMI).

Sports Participation-Participants in the study were prompted to disclose their involvement in team sport by responding to the question, "During the past 12 months, on how many sports teams did you play?" Response options ranged from 0 to 3 or more teams.

Depressive Symptoms-Participants were asked to report their experiences of depressive symptoms by responding to the question, "During the past 12 months, did you ever feel so sad or hopeless almost every day for two weeks or more in a row that you stopped doing some usual activities?" The response options provided were "Yes" or "No". The use of self-reported sadness as an indicator of depressive symptoms is common in large-scale studies, as it allows for broad participation and efficient data collection. It is important to note that sadness is considered here only as a symptom of depression, not a clinical diagnostic outcome. This approach has been validated in previous research, where similar self-reported measures have been used to assess depressive symptoms in adolescents [36,37].

Behavioural Variables-According to previous research [38–40], certain selected behavioural factors served as covariates in this study. Participants addressed an inquiry asking, "During the past week, how many days did you engage in sports exercises for at least 60 min each day?" Response options encompassed "0–7 days," with dichotomised responses indicating compliance with physical activity guidelines recommending a minimum of one hour of moderate-to vigorous-intensity PA [41]. Furthermore, participants responded to two queries about daytime screen time: "On average, how many hours do you spend on video and computer games, watching TV, or using the computer for non-school-related activities?" Responses were dichotomised to reflect adherence to the ≤ 2 h of screen time guideline per day [41]. Additionally, participants answered an item regarding night-time sleep: "On average, how long do you spend sleeping at night?" Responses were dichotomised to indicate adherence to the 8–10 h of nightly sleep guideline for adolescents aged 14–17 [41].

Covariates

Data Collection on Study Participants-A self-administered questionnaire assessed information about participants, including sex (female/male), grade, race/ethnicity, and variables related to living behaviour (consumption of cigarettes, alcohol, screen time, threats, fruit, vegetable, and breakfast). What's more, participants reported on their engagement in physical activity and television watching. These variables were considered as covariates in subsequent statistical analyses.

Statistical analysis

Analytical Procedures-Stata 16.1 (Stata Corporation, College Station, TX, USA) was utilised for all analyses in this study. To address missing data, complete cases were considered before the formal analysis. Commands specific to the survey study ("prefix: say" in STATA) were employed to produce nationally representative estimates for the study results,

adhering to the complex survey design outlined by YRBS. Population weights were calculated based on the inverse probability of selection and were applied to correct unequal selection probabilities, ensuring that the estimates accurately reflect the population. These weights help to adjust for oversampling or undersampling in certain groups, thereby improving the generalizability of the results. Descriptive statistics were employed to illustrate the characteristics of the study participants. A binomial regression model was executed to investigate the association between team sport participation (with 0 teams as the reference group) and various outcomes, including sadness (a symptom of depression) (yes or no), cigarette (0 days–all 30 days), alcohol (0 days–all 30 days), breakfast (0 days–all 30 days), PA (0 days–all 30 days), screen time (0 days–all 30 days), threats (0 days–all 30 days), fruit (0 days–all 30 days) and participating on at least one sports team (yes or no). Furthermore, regression results were stratified by gender or grade. The alpha level for all analyses was set at $p < 0.05$ to determine statistical significance.

Results

Providing a comprehensive overview of the characteristics of the study sample, Table 1 presents both the weighted and unweighted outcomes. Specifically, the sample comprises 7826 females and 8278 males, distributed across age groups (14-year-old, 15-year-old, 16-year-old, and 17-year-old), with the numbers 3418, 4448, 4312, and 3926, respectively. More than half of the sample was identified as belonging to the white race (weighted percentage = 50.40%). Notably, individuals of Hispanic/Latino and Black or African American descent constituted the second and third largest racial groups, accounting for 31.14% and 12.16% of the sample, respectively. In addition, approximately 96.28% of the subjects reported abstaining from cigarette consumption in the past 30 days, while 78.19% indicated non-consumption of alcohol during the same period. Regarding Weight status, 15.60% of the sample exhibited signs of overweight, and approximately 17.64% were classified as obese. The study sample exhibited varying sports participation, with 23.95%, 14.85%, and 12.21% engaging in one, two, and three or more teams, respectively. Approximately 40.72% of the study sample reported experiencing feelings of sadness. Detailed information is available in Table 1.

Table 2 presents the regression results illustrating the relationship between feelings of sadness and participation in sports teams. The overall findings indicate a negative association between sports participation and feelings of sadness among the subjects. As delineated in Table 2, in comparison to those not engaged in any team sport, individuals involved in one, two, and three or more teams exhibit a reduced likelihood of experiencing feelings of sadness with odds ratios of 1.17 (95% CI: 1.04–1.31), 1.29 (95% CI: 1.16–1.43), and 1.50 (95% CI: 1.24–1.80), respectively.

In Table 3, outcomes for the relationship between sports team participation and sadness were presented, considering gender, age, and race, after the adjustment for all other

TABLE 1

Descriptive results of the study sample, both weighted and un-weighted

		Unweighted count	Unweighted percentage	Weighted percentage
Age	14 years old	3418	21.22%	21.27%
	15 years old	4448	27.62%	26.99%
	16 years old	4312	26.78%	26.47%
	17 years old	3926	24.38%	25.26%
Gender	Female	7826	48.60%	48.68%
	Male	8278	51.40%	51.32%
Grade	9th grade	4601	28.57%	27.99%
	10th grade	4491	27.89%	27.13%
	11th grade	4101	25.47%	25.64%
	12th grade	2911	18.08%	19.23%
Race	Black or African American	2240	13.91%	12.16%
	White	8760	54.40%	50.40%
	Hispanic/Latino	4047	25.13%	31.14%
	All other races	1057	6.56%	6.23%
Cigarette	0 days	15,505	96.28%	96.30%
	1 or 2 days	281	1.74%	1.56%
	3 to 5 days	109	0.68%	0.69%
	6 to 9 days	36	0.22%	0.22%
	10 to 19 days	64	0.40%	0.46%
	20 to 29 days	23	0.14%	0.18%
	All 30 days	86	0.53%	0.51%
Alcohol	0 days	12,592	78.19%	78.09%
	1 or 2 days	1956	12.15%	12.27%
	3 to 5 days	812	5.04%	5.23%
	6 to 9 days	425	2.64%	2.41%
	10 to 19 days	201	1.25%	1.30%
	20 to 29 days	46	0.29%	0.22%
	All 30 days	72	0.45%	0.48%
Breakfast	0	3527	21.90%	21.84%
	1 day	1587	9.85%	9.91%
	2 days	2104	13.07%	12.53%
	3 days	1568	9.74%	9.84%

(Continued)

Table 1 (continued)

		Unweighted count	Unweighted percentage	Weighted percentage
Physical activity	4 days	1180	7.33%	7.19%
	5 days	1294	8.04%	8.03%
	6 days	834	5.18%	5.43%
	7 days	4010	24.90%	25.22%
	0 days	2510	15.59%	15.49%
	1 day	1120	6.95%	7.01%
	2 days	1570	9.75%	9.74%
Screen time	3 days	1814	11.26%	11.87%
	4 days	1666	10.35%	10.48%
	5 days	2154	13.38%	13.81%
	6 days	1279	7.94%	7.91%
	7 days	3991	24.78%	23.71%
	0 h	960	5.96%	5.84%
	1 h per day	780	4.84%	4.65%
Weight status	2 h per day	2171	13.48%	13.32%
	3 h per day	3152	19.57%	19.21%
	4 h per day	2792	17.34%	17.73%
	5 or more h per day	6249	38.80%	39.26%
	Non overweight obesity	10,751	66.76%	67.47%
Threats	Overweight	2512	15.60%	15.90%
	Obesity	2841	17.64%	16.87%
Fruit	0 times	15,025	93.30%	93.49%
	1 time	493	3.06%	3.03%
	2 or 3 times	332	2.06%	1.95%
	4 or 5 times	104	0.65%	0.64%
	6 or 7 times	30	0.19%	0.14%
	8 or 9 times	23	0.14%	0.15%
	10 or 11 times	16	0.10%	0.11%
Fruit	12 or more times	81	0.50%	0.49%
	0 times	2176	13.51%	13.47%
	1 to 3 times	5618	34.89%	35.58%
	4 to 6 times	3323	20.63%	21.25%
Fruit	1 time per day	1707	10.60%	10.56%
	2 times per day	1755	10.90%	10.31%
	3 times per day	742	4.61%	4.52%

(Continued)

Table 1 (continued)

		Unweighted count	Unweighted percentage	Weighted percentage
Eating vegetables	4 or more times per day	783	4.86%	4.31%
	Yes	1519	9.43%	9.24%
	No	14,585	90.57%	90.76%
Sports participation	0	7888	48.98%	50.16%
	1 team	3857	23.95%	24.46%
	2 teams	2392	14.85%	14.90%
	3 or more teams	1967	12.21%	10.47%
	Sadness			
	Yes	6558	40.72%	43.43%
	No	9546	59.28%	56.57%

TABLE 2

Overall regression between sadness and participation in sports team

	Sadness	OR	Sig	95% CI
Sports participation				
	0 team	Ref		
	1 team	1.17	0.01	1.04 1.31
	2 teams	1.29	0.00	1.16 1.43
	3 or more teams	1.50	0.00	1.24 1.80

Note: Ref, reference group. All models were controlled for Age, Gender, Grade, Race, Cigarette, Alcohol, Breakfast, PA, ST, Threats, Fruit and Eating vegetables.

TABLE 3

Relationship between sadness and participation in sports teams by gender, age and race

	1 team			2 team			3 or more teams					
	OR	95% CI	Sig	OR	95% CI	Sig	OR	95% CI	Sig			
Gender												
	Females	1.16	0.97 1.38	0.09	1.29	1.10 1.52	0.00	1.65	1.17 2.34	0.01		
	Males	1.17	0.92 1.47	0.19	1.29	1.08 1.53	0.01	1.39	1.10 1.75	0.01		
Age												
	14 yr	1.18	0.90 1.54	0.22	1.22	0.82 1.81	0.33	1.22	0.77 1.93	0.39		
	15 yr	1.12	0.91 1.38	0.26	1.28	0.96 1.69	0.09	1.50	0.98 2.27	0.06		
	16 yr	1.09	0.84 1.43	0.50	1.23	0.91 1.66	0.17	1.56	1.12 2.16	0.01		
	17 yr	1.28	1.01 1.64	0.04	1.41	1.05 1.89	0.02	1.81	0.98 3.35	0.06		
Race												
	Black or African American	0.92	0.69 1.23	0.55	1.26	0.67 2.39	0.47	1.38	0.78 2.44	0.27		
	White	1.25	1.01 1.54	0.04	1.51	1.22 1.87	0.00	1.71	1.31 2.24	0.00		
	Hispanic/Latino	1.05	0.87 1.27	0.58	0.98	0.65 1.49	0.92	1.02	0.71 1.46	0.91		
	All other races	1.53	1.02 2.31	0.04	1.05	0.63 1.76	0.84	3.07	1.10 8.55	0.03		

relevant control variables. As indicated by Table 3, the notable correlation between engagement in sports teams and the reporting of sadness exhibits a dose-dependent pattern. More specifically, in contrast to male subjects who did not engage in any sports teams, those participating in multiple teams were less prone to reporting sadness. A similar trend was discerned among female participants, with an even more pronounced and statistically significant reduction. Furthermore, Table 3 presents the outcomes delineating the association between participation in sports teams and feelings of sadness within the study sample, segmented by different age groups. For age 14 years, engaging in two or three team sport (1 team OR = 1.18, 95% CI: 0.90–1.54; 2 teams OR = 1.22, 95% CI: 0.82–1.81; 3 or more teams OR = 1.22, 95% CI: 0.77–1.93) were less likely to suffer from Sadness. This association remained significant in ages 15-, 16- and 17-year-old. Table 3 exhibits the association between participation in sports teams and feelings of sadness within the study sample, categorized by different racial groups. In group White, a dose-dependent relationship was detected, indicating a decreased likelihood of suffering from sadness with more sports team participation. Contrarily, for Hispanic/Latino and individuals of all other races, the observed correlation between sports team participation and feelings of sadness or depression did not exhibit a dose-dependent pattern. It is noteworthy that among individuals of all other races, those participating in three or more team sport displayed the highest odds (OR = 3.07, 95% CI: 1.10–8.55) of not reporting sadness in comparison to those with no team sport involvement.

Discussion

The current study seeks to explore the impact of variables such as gender, grade, and race on the connection between sports participation and depressive symptoms. In summary, the

study reveals a negative correlation between participation in team sport and symptoms of depression in adolescents. Notably, this association remains significant irrespective of gender, grade, or race.

Gender differences

Disparities in sports participation based on gender were observed in most countries [42,43]. Additionally, research has identified variations in gender differences regarding the connection between physical activity and depressive symptoms, particularly with Chinese population participants [44]. In this study, the relationship between sports participation and depressive symptoms can be dose-dependent for both males and females. However, gender differences in the impact of different depressive symptoms and sports participation were found. As the number of participating teams increased, the change in OR data was more significant in female subjects than in males. In other words, increased participation in team sport has a more pronounced effect on the resistance to depression that may occur in female individuals. The possible reason for this difference could be attributed to the historical dominance of a particular masculine ethos in sports, characterised by prevailing and robust masculinity [45]. Over an extended period, women have faced historical constraints on their participation in sports, leading to limited engagement [46]. In contrast, males have traditionally been more accustomed to active involvement in physical activities [47].

Age difference

Furthermore, the present study investigated differences in age concerning the relationship between participation in team sport and depressive symptoms. The results demonstrate a dose-dependent relationship for all age categories except for the age group 14 years old. Meanwhile, it is observed that the older the subjects are, the more significant the moderating effect of team sport participation on depression. This may be explained by the fact that older adolescents are more socially and psychologically independent from their families than younger [48,49], and team sport participation is considered a way to exclude loneliness [50]. Additionally, preceding research has illustrated that distinct socioeconomic indicators may exert varying influences on the PA of students across different grade levels, particularly during weekends [51]. Junior high school students tend to gradually develop their preferences and interests in sports, with a diminishing impact of parental influence and an increasing sway of material wealth [52]. As students progress to high school, an augmented sense of independence from familial ties is anticipated. During this period, parental influence diminishes, and students' autonomy is heightened, leading to limited time spent with parents [53]. The waning impact of parents is supplanted by the influences of school and peers [54]. This shift may be attributed to older adolescents' greater social and psychological autonomy from their families, coupled with the potential financial constraints that make sports participation more costly for older adolescents, rendering them persistently dependent on family financial support [55,56].

Race differences

An interesting finding in this work is that while team sport engagement contributes to a reduced likelihood of experiencing symptoms of depression across various racial backgrounds, differences persist among different racial groups. The results indicate that, for White and Black/African American subjects, increased participation in sports teams correlates with a decrease in depression symptoms with a dose-dependent effect. However, for Hispanic/Latino and individuals of all other races, the OR figure experienced a fluctuation from 1 team to 2 teams and three or more teams. Previous studies found that cultural heritage, as well as race/ethnicity, may impact Physical Activity attitudes [57,58], and race played differentiated roles in affecting depressive symptoms [58,59]. However, the results of the current research may not provide support for the assertion that participation in team sport moderated depression symptoms differently for individuals of different races. The race differences observed in this study could probably be attributed to the demographic composition of the sample employed. The data revealed that the sports participation rate among subjects of Hispanic/Latino and other racial groups is comparatively low, highlighting the significance of cautious interpretation when comparing results, especially in cases where specific sample groups exhibited limited participation in team sport. This study considers racial disparities, specifically among whites, blacks, and Latinos, in addressing demographic inequality. These groups may be influenced uniquely by the variances in access to sports resources and socio-economic factors linking sports engagement and depressive symptoms. To achieve such interventions, there is a need to understand these racial dynamics to customise mental health benefits for diverse youth and the challenges they face.

Practical implications and limitations

The findings of this study carry various practical implications for future research. Firstly, the study emphasises the suggestion that involvement in physical activity can have a positive impact on the mental well-being of adolescents. The connection between physical activity and diminished symptoms of depression, especially the advantageous role of participating in team sport, is underscored within the U.S. sample. This moderating effect was observed across various demographic factors, including age, gender, and ethnicity—secondly, the choice of the United States as the study sample is recognized for its value. The U.S., a multiracial and multicultural country [60], provides a diverse sample for research. Moreover, as a developed sports nation, the high level of sports participation among the American population makes it meaningful to investigate adolescents' physical activity in this context. Thirdly, the study brings attention to gender differences in team sport participation and its influence on depression symptoms. While the observed gender differences may not be dramatic, they raise interesting questions about gender equity and fairness in emerging research on gender and sports. Exploring whether females have equal opportunities and fair treatment is an avenue for further investigation in gender and sports/physical education research. Furthermore, ensuring

equitable availability of physical education resources for male and female students is instrumental in diminishing the gender disparity in physical fitness. Consequently, establishing a positive and friendly learning environment [61–63] that incorporates inclusive and mindful pedagogical approaches will enhance overall physical activity outcomes for individuals of all genders. Ultimately, it is imperative to underscore that aiding students in maintaining a healthy BMI is a favourable approach to substantially enhancing their mental well-being. Feasible strategies to attain this objective may encompass integrating nutritional education into the curriculum, instilling awareness of mindful eating practices among students, and augmenting the inclusion of vegetables and proteins in school meals. Indeed, any additional pragmatic suggestions geared towards ameliorating students' physical or mental welfare find support in the study's findings, given the substantiated close correlation between the two.

Admittedly, some of the limitations in the present study should be acknowledged. Firstly, its cross-sectional design may not fully establish causality. Secondly, self-report methods could introduce subjective biases. Notably, the use of self-reported feelings of sadness, while common in brief surveys, does not encompass the full spectrum of clinical depression. This limitation should be considered when interpreting the findings. Future research could address these concerns by adopting longitudinal designs for temporal insights and employing more objective monitoring methods to enhance precision in measuring adolescent sports participation and its impact on depression symptoms. Moreover, a paramount limitation of this study unquestionably resides in the absence of differentiation based on types of movement, as the categorisation was solely contingent on frequency. The study lacks comprehensive data about the nuanced distinctions among various kinds of sports, thus posing a gap in the current study.

Conclusion

This study posits that adolescents immersed in extensive team sport engagement experience a propensity for diminished manifestations of depressive symptoms. Discernible variances in demographic elements, encompassing gender, race, and age, have been elucidated. These findings underscore the salience of physical activity in mitigating adverse affective states, accentuating the imperative for public health practitioners and policymakers to advocate the cultivation of team sport involvement amidst the adolescent cohort. Moreover, the research emphasizes the imperative to acknowledge gender disparities and attend to the mental well-being of gender minority cohorts. It advocates the necessity for bespoke intervention strategies tailored to females and gender minority groups across disparate geopolitical contexts. Subsequent inquiries ought to scrutinize the influence of race or ethnicity on the moderating efficacy of team sport participation vis-à-vis depressive symptoms. Conscientious physical activity research must proactively confront social equity issues and espouse inclusivity, particularly about heterogeneous gender and ethnic cohorts.

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Availability of Data and Materials: YRBS datasets are publicly available online at: <https://www.cdc.gov/yrebs/index.html> (accessed on 10 December 2023).

Ethics Approval: The study was approved by the Ethics Committee at Soochow University (SUDA20240626H06). All participants signed the informed consent in this study.

Conflicts of Interest: The authors declare that they have no conflicts of interest to report regarding the present study.

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