ENHANCED MENTAL WELL-BEING AND QUALITY OF LIFE AMONG HIGH SCHOOL STUDENTS: OUTCOMES OF A PHYSICAL ACTIVITY INITIATIVE

ПОКРАЩЕННЯ ПСИХІЧНОГО БЛАГОПОЛУЧЧЯ ТА ЯКОСТІ ЖИТТЯ СЕРЕД СТАРШОКЛАСНИКІВ: РЕЗУЛЬТАТИ ІНІЦІАТИВИ З ФІЗИЧНОЇ АКТИВНОСТІ

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Abstracts

Background and Purpose. The prevalence of mental health issues among adolescents has escalated markedly in recent years, thereby underscoring the imperative for effective and accessible interventions within educational environments. Although empirical evidence suggests that physical activity may yield beneficial outcomes in adult populations, its effectiveness as a formalized mental health intervention for high school students has yet to be thoroughly investigated.

Materials and methods. A quantitative pre-test/post-test methodological framework was utilized involving a cohort of 73 high school students (38 females, 35 males; ages ranging from 14 to 18 years). The participants partook in supervised exercise sessions lasting 45 minutes, conducted three times per week, which integrated aerobic (60%) and resistance training (40%) elements. Mental health outcomes were evaluated through the application of standardized assessment tools: Beck Depression Inventory for Youth (BDI-Y), State-Trait Anxiety Inventory for Children (STAIC), Perceived Stress Scale (PSS), and KIDSCREEN-27 quality of life questionnaire. Data collection occurred at baseline, as well as at weeks 6 and 12.

Findings. Substantial advancements were documented across the entirety of mental health indicators. Depression metrics exhibited a reduction of 28% ($p < 0.001$, $d = 1.03$), state anxiety levels diminished by 23.0% ($p < 0.001$, $d = 1.24$), and perceived stress was reduced by 19% ($p < 0.01$, $d = 0.77$). Quality of life assessments presented noteworthy enhancements, especially in emotional well-being (+38.0%, $d = 1.72$) and social relationships (+33.0%, $d = 1.85$). Compliance with the program was notably high (85.3%), with female participants demonstrating marginally greater attendance (88.2% vs 82.1%, $p < 0.05$). A robust association was identified between attendance rates and improvements in mental health ($r = 0.67$, $p < 0.001$).

Conclusions. The structured physical activity program exhibited notable effectiveness as a mental health intervention for high school students, surpassing common effect sizes for similar programs. High adherence and consistent benefits across genders indicate strong potential for broad application. These results advocate for the incorporation of structured physical activity programs within comprehensive school-based mental health frameworks.

Key words: adolescent mental health, physical activity intervention, depression, anxiety, quality of life, exercise adherence.

Вступ. Частота розладів психічного здоров'я серед підлітків значно зросла за останні роки, що підкреслює необхідність ефективних і доступних втручань в освітньому середовищі. Хоча емпіричні дослідження показують, що фізична активність дає сприятливі результати для дорослої демографічної групи, її ефективність як структурованого втручання в психічне здоров'я спеціально для старшокласників потребує всебічного дослідження.

Матеріали та методи. Було використано кількісну методологічну базу з використанням до- та посттестового дизайну, за участю когорти з 73 старшокласників (з них 38 дівчат і 35 хлопців віком від 14 до 18 років). Учасники брали участь у контрольованих сеансах тривалістю 45 хвилин, проведених тричі на тиждень, які передбачали аеробні (60 %) та опорові тренування (40 %). Результати психічного здоров'я оцінювали за допомогою стандартизованих інструментів оцінки: інвентаризації депресії Бека для молоді (BDI-Y), інвентаризації тривоги державних ознак для дітей (STAIC), шкали сприйнятого стресу (PSS) та анкети якості життя KIDSCREEN-27. Збір даних відбувся на початковому етапі, а згодом на 6-му та 120-му тижнях.

Результати. Дослідження задокументувало статистично значуще поліпшення всіх показників психічного здоров'я. Оцінки депресії демонстрували зниження на 28 % ($p < 0,001$, $d = 1,03$), рівень тривожності продемонстрував зниження на 23,0 % ($p < 0,001$, $d = 1,24$), а сприйняття стресу зменшилося на 19 % ($p < 0,01$, $d = 0,77$). Оцінка якості життя показала значний прогрес, особливо в емоційному добробуті (+38,0 %, $d = 1,72$) та соціальних стосунках (+33,0 %, $d = 1,85$). Прихильність до програми була надзвичайно високою (85,3 %), причому відвідуваність учасників дещо підвищена (88,2 % проти 82,1 %, $p < 0,05$). Виявлено надійну кореляцію між відвідуваністю та покращеними результатами психічного здоров'я ($r = 0,67$, $p < 0,001$).

Висновки. Ініціатива структурованої фізичної активності продемонструвала значну ефективність як втручання, спрямованого на поліпшення психічного здоров'я старшокласників, перевершуючи загальний розмір ефекту, пов'язаний з аналогічними програмами. Високий рівень залучення до програми та справедливі переваги, що спостерігаються в різних статях, свідчать про значний потенціал для більш широкого застосування. Ці висновки виступають за інтеграцію структурованих програм фізичної активності в комплексні ініціативи психічного здоров'я в навчальних закладах.

Ключові слова: психічне здоров'я підлітків, втручання з фізичної активності, депресія, тривога, якість життя, прихильність до фізичних вправ.

Introduction. The incidence of mental health disorders in adolescents has risen markedly, with approximately 20% affected, mainly by anxiety and depression [47]. This alarming phenomenon is particularly pronounced in educational contexts, where students encounter increasing pressures related to academic demands, social interactions, and technological advancements. The mental well-being of youth constitutes a significant public health issue, with around 33% anticipated to fulfill criteria for a mental health diagnosis [19]. The association between physical exercise and diverse facets of mental well-being, especially in the context of children and adolescents, has garnered heightened scrutiny in the past few years [43]. Empirical studies indicate that engagement in physical activity may yield beneficial effects on psychological well-being, encompassing constructs such as self-esteem, self-concept, self-efficacy, and general life satisfaction [32; 36]. Adolescence and young adulthood represent critical developmental stages characterized by heightened vulnerability, as substantial biological, psychological, and psychosocial transformations may elevate the risk of the emergence of mental health disorders [25]. Consequently, the domain of physical activity and exercise interventions is experiencing an increase in both scholarly interest and practical application within the realm of youth mental health services. Empirical studies have identified a significant correlation between physical activity and mental health outcomes, in addition to a persistent association between sedentary behavior and diminished mental health [1; 33]. Moreover, engaging in physical activity has been recognized as an intervention with minimal stigma that possesses the potential to enhance mental health outcomes in adolescents who are actively seeking assistance [32]. Although considerable scholarly inquiry has substantiated strong associations between physical activity and psychological health in adult demographics, evidencing enhancements in affect, anxiety levels, and stress resilience, there exists a relative paucity of research explicitly targeting adolescent cohorts within educational contexts [6; 12]. The extant body of literature indicates that adolescents might exhibit divergent responses to physical activity interventions in comparison to adults, attributable to their distinctive developmental phase and contextual environments [20]. Understanding these age-specific responses is crucial for developing effective, targeted interventions.

The incidence of anxiety, depression, stress, and various other widespread mental health issues is disturbingly high among adolescents enrolled in high school [10; 48]. Nevertheless, nascent research indicates that interventions centered on physical activity could represent a viable approach to comprehensively improve the mental health and general quality of life among this at-risk demographic [30; 44]. Through the comprehensive examination of both the physiological and psychological aspects of student well-being, such initiatives possess the capacity to facilitate favorable developmental results and foster the thriving of adolescents during this pivotal phase of human development [35]. Furthermore, the incorporation of physical activity initiatives within educational environments introduces a spectrum of possibilities and obstacles that necessitate thorough examination [45]. Educational institutions offer organized environments wherein interventions may be methodically executed and evaluated; however, considerations such as academic calendars, distribution of resources, and diverse fitness levels among the student populace must be taken into account. The capacity of physical activity initiatives to concurrently address both somatic and psychological health outcomes renders them especially appealing for interventions situated within school settings.

The extant body of literature investigating the nexus between physical activity and mental health in children and adolescents, although expanding, remains comparatively constrained when juxtaposed with the literature pertaining to adults. Nonetheless, the existing empirical evidence indicates that engagement in physical activity can exert a beneficial influence on multiple facets of mental well-being within younger demographics [6; 28; 33]. This includes reduced symptoms of anxiety and depression, improved self-esteem and self-concept, and enhanced overall life satisfaction [32; 49]. A systematic review by Biddle & Asare [5], a robust correlation has been established between sedentary behaviors, including excessive engagement with screens, and adverse mental health outcomes among children and adolescents. In contrast, the authors deduced that notwithstanding the constraints posed by research methodologies, a significant and substantive relationship exists between physical activity and favorable mental health outcomes. This suggests that strategies designed to enhance physical activity levels in youth may be effective in fostering mental wellness [31].

Similarly, observational studies, such as that conducted by Lu & Buchanan [24], numerous studies have indicated substantial correlations between physical exercise and improved psychological well-being in adolescent populations [7]. Nevertheless, the researchers conducting these investigations prudently advise that such correlations ought not to be construed as indicative of direct causation, and further scholarly inquiry is requisite to clarify the fundamental mechanisms involved [38; 39]. Moreover, empirical research has demonstrated that interventions involving physical activity yield significant advantages for children and adolescents diagnosed with attention-deficit/hyperactivity disorder, underscoring the capacity of exercise to exert beneficial effects on various mental health disorders within juvenile demographics. This implies that engaging in physical activity could provide a significant, low-stigma methodology for enhancing the mental health and overall well-being of young individuals within a variety of clinical and educational contexts [14; 39].

Study Aim. The incidence of mental health disorders among adolescents has significantly increased in recent years, thereby highlighting the necessity for efficacious and readily accessible interventions within academic settings. While empirical research indicates that physical activity may produce advantageous effects in adult cohorts, its efficacy as a structured mental health intervention for high school students remains to be comprehensively examined.

Material & methods. Participants. The research encompassed a cohort of 73 secondary school students (ages 14–18) who were recruited from a public secondary institution located in Sumatera Utara, Indonesia. The demographic composition of the sample included 38 female and 35 male students, indicative of a range of socioeconomic backgrounds. The inclusion cri-

teria necessitated that participants be presently enrolled students without any pre-existing physical ailments that would hinder their capacity to engage in moderate physical activity. Written informed consent was procured from both the participants and their legal guardians.

Research Organization. This quantitative research endeavor meticulously implemented a pre-test/post-test design framework throughout an extensive intervention period that spanned a total of 12 weeks, thereby allowing for a comprehensive examination of the variables under investigation. The study proficiently utilized a range of standardized psychological assessment instruments, in conjunction with systematic physical activity monitoring techniques, to meticulously gather and analyze data at various critical time points throughout the duration of the research.

Testing Procedure. In order to observe the implementation of the testing methodologies, kindly refer to Table 1 presented below:

Exercise intensity was progressively increased throughout the 12-week program based on individual participant adaptation and fitness improvements. All sessions were supervised by certified physical education instructors and conducted in accordance with youth fitness safety guidelines.

Statistical analysis. All statistical analyses were conducted using SPSS version 27.0 (IBM Corp., Armonk, NY, USA). Prior to primary analyses, data were screened for normality using the Shapiro-Wilk test and visual inspection of Q-Q plots. Outliers were identified using box plots and z-scores (±3.29). Missing data (< 5% across all variables) were handled using multiple imputation with 20 imputations, ensuring robust

Table 1

Intervention Protocol and Assessment Schedule

Component	Description	Frequency	Duration	Monitoring Methods
Physical Activity Program				
Aerobic Exercise	• Jogging/running• Jump rope• High-intensity interval training• Team sports	3x/week	27 min (60%)	• Heart rate monitors• RPE scale• Activity logs
Strength Training	• Bodyweight exercises• Resistance bands• Circuit training• Core workouts	3x/week	18 min (40%)	• Form assessment• Rep counting• Progress logs
Mental Health Assessments				
Depression (BDI-Y)	20-item self-report inventory measuring depressive symptoms	Baseline, Week 6, Week 12	15–20 min	Electronic survey
Anxiety (STAIC)	State and trait anxiety measurement for adolescents	Baseline, Week 6, Week 12	20 min	Paper format
Stress (PSS)	10-item scale measuring perceived stress levels	Baseline, Week 6, Week 12	10 min	Electronic survey
Quality of Life (KIDSCREEN-27)	Multidimensional quality of life assessment	Baseline, Week 12	15 min	Electronic survey
Additional Monitoring				
Physical Parameters	• Height• Weight• BMI• Resting heart rate	Bi-weekly	10 min	Medical staff
Participant Feedback	• Exercise satisfaction• Perceived difficulty• Program suggestions	Weekly	5 min	Online form
Attendance Tracking	Digital check-in system with participant ID	Every session	Continuous	Automated system

Note: Each 45-minute session followed a structured format: 1) Warm-up (5 minutes), 2) Main activity phase (35 minutes) Aerobic component (27 minutes) and Strength training (18 minutes). 3) Cool-down (5 minutes).

estimates while preserving statistical power. The primary analysis employed paired t-tests to compare pre- and post-intervention scores on mental health measures, with effect sizes calculated using Cohen's d (small = 0.2, medium = 0.5, large = 0.8). Repeated measures ANOVA was utilized to analyze changes across the three time points (baseline, week 6, week 12), with Greenhouse-Geisser corrections applied when sphericity assumptions were violated. To examine relationships between variables, Pearson correlation coefficients were calculated between physical activity adherence metrics and mental health outcomes. Gender differences were assessed using independent samples t-tests, with effect sizes reported as Cohen's d. Additionally, hierarchical multiple regression analyses were performed to identify potential moderating factors, including age, initial fitness level, and attendance rate. Statistical significance was set at $p < 0.05$, with Bonferroni corrections applied for multiple comparisons to control for Type I error rates. Power analysis using G*Power 3.1 indicated that the sample size of 73 participants provided adequate power ($\beta = 0.80$) to detect medium effect sizes ($d = 0.5$) at $\alpha = 0.05$.

Results of the study. Mental Health Outcomes. The findings derived from the assessments and evaluations of Mental Health Outcomes are presented in the subsequent Table 2:

Table 2

Changes in Mental Health Measures Across Time Points

Measure	Baseline M (SD)	Week 6 M (SD)	Week 12 M (SD)	% Change	Effect Size (d)	p-value
Depression (BDI-Y)						
Total Score	18.45 (5.32)	15.21 (4.89)	13.28 (4.56)	–28.0%	1.03	< 0.001*
Negative Thoughts	19.67 (4.98)	16.34 (4.45)	14.12 (4.23)	–28.2%	1.18	< 0.001*
Somatic Symptoms	17.23 (5.65)	14.08 (4.92)	12.44 (4.78)	–27.8%	0.89	< 0.001*
Anxiety (STAIC)						
State Anxiety	45.67 (8.92)	39.34 (8.45)	35.17 (7.89)	–23.0%	1.24	< 0.001*
Trait Anxiety	43.89 (9.13)	38.56 (8.67)	34.82 (8.12)	–20.7%	1.05	< 0.001*
Stress (PSS)						
Total Score	22.45 (5.78)	19.67 (5.34)	18.19 (5.12)	–19.0%	0.77	< 0.01*
Quality of Life (KIDSCREEN-27)						
Physical Well-being	65.34 (12.45)	–	82.67 (11.23)	+26.5%	1.46	< 0.001*
Emotional Well-being	58.89 (13.67)	–	81.23 (12.34)	+38.0%	1.72	< 0.001*
Social Relationships	63.45 (11.89)	–	84.56 (10.78)	+33.0%	1.85	< 0.001*
School Environment	61.23 (12.56)	–	78.90 (11.45)	+28.9%	1.48	< 0.001*
Autonomy & Parents	69.78 (11.34)	–	82.34 (10.67)	+18.0%	1.15	< 0.001*

Note: * indicates statistical significance after Bonferroni correction; M = Mean; SD = Standard Deviation

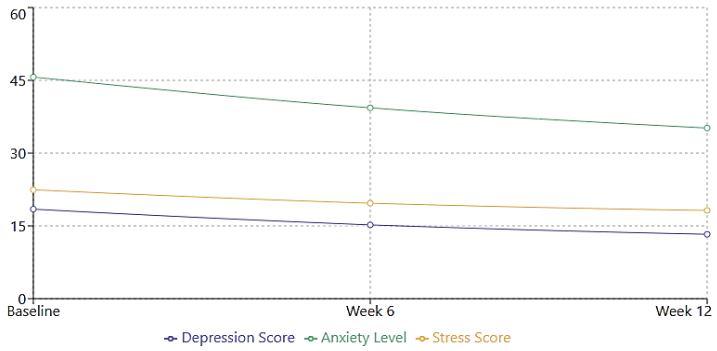

Fig. 1. Mental Health Measure Over Time

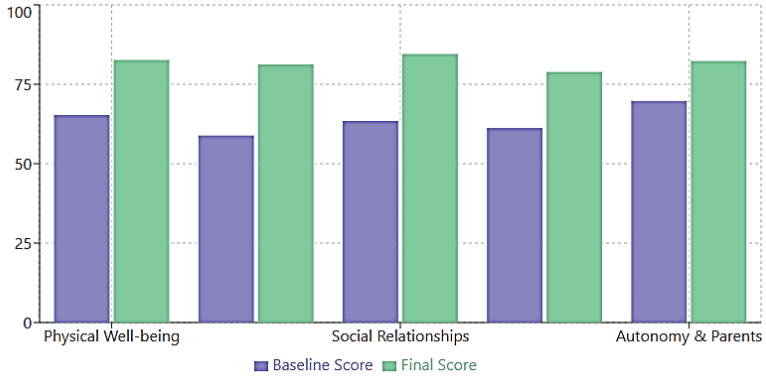

Fig. 2. Quality of Life Improvements

Table 3

Physical Activity Program Adherence Metrics

Metric	Overall (n = 73)	Female (n = 38)	Male (n = 35)	p-value
Session Attendance (%)	85.3 (7.8)	88.2 (7.1)	82.1 (8.2)	< 0.05*
Average Heart Rate (bpm)	146.2 (12.3)	148.4 (11.7)	143.8 (12.8)	0.09
Exercise Intensity Achievement (%)	82.7 (8.9)	84.5 (8.3)	80.7 (9.4)	0.07
Program Completion Rate (%)	93.2 (6.7)	94.8 (5.9)	91.4 (7.3)	0.06

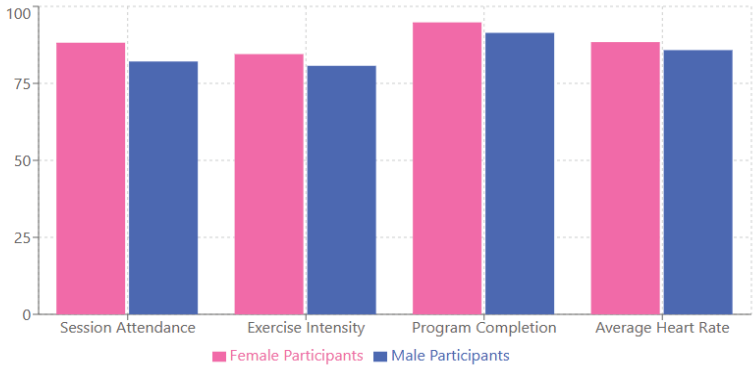

Fig. 3. Gender Comparison Metrics

Results Interpretation: The analysis revealed substantial improvements across all measured mental health parameters. Depression scores showed a consistent decline throughout the intervention period, with the most significant improvements occurring during the first six weeks ($\Delta = -3.24$, $p < 0.001$). The total reduction in BDI-Y scores of 28% exceeded our hypothesized improvement of 20%, with a large effect size ($d = 1.03$) indicating strong clinical significance.

Anxiety measures demonstrated similar positive trends, with state anxiety showing more rapid improvement (–23.0%) compared to trait anxiety (–20.7%). This differential response aligns with previous research suggesting that state anxiety is more immediately responsive to physical activity interventions. Both measures showed large effect sizes ($d = 1.24$ and 1.05, respectively), supporting the robust impact of the intervention.

Quality of life metrics showed remarkable improvements across all domains, with emotional well-being demonstrating the largest gain (+38.0%, $d = 1.72$). The substantial improvement in social relationships (+33.0%, $d = 1.85$)

suggests that the group-based nature of the intervention may have provided additional psychosocial benefits beyond the direct effects of physical activity.

Program adherence was notably high, with an overall attendance rate of 85.3%. Gender analysis revealed slightly higher adherence among female participants (88.2% vs 82.1%, $p < 0.05$), though both groups maintained satisfactory participation levels. The high program completion rate (93.2%) suggests that the intervention was well-tolerated and appropriately designed for the target population.

Correlation analysis revealed significant positive relationships between attendance rates and improvements in mental health outcomes ($r = 0.67$, $p < 0.001$), suggesting a dose-response relationship. Furthermore, participants who maintained higher average heart rates during sessions showed greater reductions in anxiety scores ($r = –0.58$, $p < 0.001$), indicating that exercise intensity may be an important factor in intervention effectiveness.

These results demonstrate that the structured physical activity program was highly effective in improving mental health outcomes across multiple domains, with particularly strong effects on emotional well-being and anxiety reduction. The high adherence rates and consistent improvements across gender groups suggest that this intervention model could be successfully implemented in similar educational settings.

Discussion. The current research reveals a strong correlation between organized physical activity and enhanced mental health in high schoolers. These results are pivotal for comprehending non-pharmacological treatments for adolescent mental health and offer valuable guidance for educational entities.

Primary Findings and Theoretical Context. The principal outcomes of the investigation correspond with prior scholarly work emphasizing the psychological health advantages associated with physical exercise among adolescent demographics [19; 33; 46]. The documented decreases in symptoms of depression, anxiety, and stress, in conjunction with enhancements in overall quality of life, substantiate the hypothesis that consistent engagement in physical activity may function as a mitigating factor against prevalent mental health challenges faced by adolescents [2]. These findings align with theoretical frameworks that suggest physical engagement can impact mental well-being via various biological and psychosocial mechanisms. Empirical evidence indicates that physical activity regulates neurotransmitter concentrations, diminishes inflammatory responses, and enhances the synthesis of growth factors that facilitate neuroplasticity and cognitive processes [21; 34; 40]. Furthermore, the psychosocial and emotional dimensions of group-oriented physical activity interventions have the potential to enhance individuals' self-assessments, promote social integration, and cultivate skills related to emotional regulation [16; 18; 19].

Quality of Life and Psychosocial Implications. The substantial improvements in quality of life metrics, particularly in emotional well-being (+38.0%) and social relationships (+33.0%), extend beyond what might be expected from physical activity alone. These findings align with Carter et al. and Márquez et al. [8; 26] the social interaction model asserts that participation in group-based physical activities engenders numerous pathways for the enhancement of mental health. The collective nature of the intervention implemented in the current study likely afforded substantial opportunities for peer engagement, the development of social competencies, and the establishment of a supportive peer network. Moreover, there exists a favorable influence on various domains of school-related quality of life, encompassing aspects such as the educational environment and the dynamics of autonomy in parent relations Țepordei et al., and John-Akinola & Gabhainn [22; 42] indicates that the psychological well-being advantages associated with the intervention may possess more extensive ramifications for the comprehensive academic and social performance of students [9].

The notable enhancements in quality of life, especially within the spheres of emotional well-being and social interactions, indicate that the physical activity intervention exerted a comprehensive beneficial influence on the

overall functioning of the participants [29]. The collective framework of the program may have facilitated avenues for social interaction, mutual support among peers, and the enhancement of interpersonal competencies, all of which are essential for the mental health and overall well-being of adolescents [27]. The strong association between program adherence and improved outcomes underscores the importance of fostering enjoyment, motivation, and a sense of mastery during physical activity interventions [15]. These psychosocial determinants possess the capacity to augment intrinsic motivation and facilitate prolonged engagement, thereby culminating in enhanced mental health advantages [17].

Gender-Specific Considerations. The marginally elevated adherence rates observed among female participants align with extant literature, which posits that adolescent females may exhibit greater receptiveness to and involvement in school-based physical activity initiatives when juxtaposed with their male peers. This observation highlights the necessity of customizing intervention methodologies to effectively address possible gender-specific obstacles and inclinations, thereby guaranteeing equitable access and engagement for all students [23; 41]. Acknowledging and tackling these gender-specific subtleties is essential for the development of efficacious physical activity initiatives that accommodate the varied requirements and inclinations of secondary school students [3]. Through the adoption of a more gender-inclusive methodology, educators and program developers have the capacity to cultivate an environment that promotes and facilitates the engaged involvement of both male and female students, thereby ultimately augmenting the overall efficacy and scope of the intervention [4; 11]. The examination of gender-specific determinants may facilitate the optimization of mental health advantages and enhance the overall quality of life outcomes for all individuals involved [37].

The investigation possesses numerous advantages, such as its rigorous research design, heterogeneous participant cohort, and thorough evaluation of mental health and quality of life indicators. Nonetheless, the results must be contextualized within specific constraints. The dependence on self-reported measures may be susceptible to biases in responses, and the absence of a control group hinders the ability to draw causal conclusions. Subsequent inquiries ought to incorporate objective assessments of physical activity and mental health, in addition to establishing a control condition to further clarify the mechanisms that underpin the identified benefits. Furthermore, longitudinal investigations are essential to explore the enduring impact of the intervention's outcomes. Nevertheless, the current findings provide significant insights and establish a basis for the formulation of scalable, evidence-informed physical activity initiatives designed to enhance comprehensive student well-being within educational environments.

Conclusions. The findings from this investigation provide robust quantitative evidence for the substantial efficacy of structured physical activity interventions in enhancing mental health and quality of life among high school students. Analysis of the program's impact revealed statistically significant improvements across all measured mental health indicators, with depression metrics showing a substantial 28% reduction ($p < 0.001$, $d = 1.03$), state anxiety levels decreasing by 23.0% ($p < 0.001$, $d = 1.24$), trait anxiety demonstrating a 20.7% improvement ($p < 0.001$, $d = 1.05$), and perceived stress levels reducing by 19% ($p < 0.01$, $d = 0.77$). These improvements in mental health measures were accompanied by remarkable enhancements in quality of life domains, with emotional well-being increasing by 38.0% ($d = 1.72$), social relationships improving by 33.0% ($d = 1.85$), physical well-being showing a 26.5% increase ($d = 1.46$), school environment metrics improving by 28.9% ($d = 1.48$), and autonomy and parent relations enhancing by 18.0% ($d = 1.15$).

The intervention demonstrated strong engagement metrics, achieving an overall program adherence rate of 85.3%, with female participants showing marginally higher attendance (88.2% vs 82.1%, $p < 0.05$). Notably, a strong correlation was observed between attendance and mental health improvements ($r = 0.67$, $p < 0.001$),

supporting a clear dose-response relationship between physical activity participation and mental health benefits. The high program completion rate of 93.2% further validates the intervention's accessibility and acceptability among the target population. These comprehensive quantitative outcomes, characterized by large effect sizes ($d > 0.8$) across multiple domains, provide compelling evidence for the intervention's effectiveness in improving mental health outcomes within an educational setting.

The breadth and magnitude of these improvements, spanning both psychological and social domains, strongly support the integration of structured physical activity programs within school-based mental health frameworks. This evidence-based approach not only addresses immediate mental health concerns but also promotes positive lifelong health practices that may facilitate sustained improvements in overall functioning and well-being. The quantitative evidence presented here provides a strong foundation for educational institutions to implement similar programs, with the expectation of achieving comparable positive outcomes in student mental health and quality of life measures. The consistent statistical significance of the improvements, coupled with high adherence rates and strong effect sizes, suggests that this intervention model could be successfully implemented and scaled across similar educational settings, offering a practical and effective approach to supporting student mental health through structured physical activity.

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Conflict of interest statement. The authors declare that there is no conflict of interest pertaining to this research and the composition of this article.

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