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ORIGINAL ARTICLE

A comparative study of fitness levels, physical health, and mental well-being among students at Mohamed Boudiaf University: Engaged vs. non-engaged in physical activities

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ABSTRACT

Aim: This study aims to investigate the relationship between physical activity (PA) participation and various health outcomes among students, including physical health status, psychological well-being, and fitness parameters, to highlight the importance of regular exercise in youth development. Methods: A cross-sectional analysis was conducted with a sample of 30 students who were categorized into active and inactive groups based on self-reported PA levels. Data collection included questionnaires assessing health and well-being, alongside physical fitness tests such as the Sargent jump, 20-meter sprint, and Illinois agility test. Statistical analyses involved Pearson chi-square tests to examine associations between PA participation and health/well-being classifications, and independent t-tests to compare fitness parameters between groups. Results: Findings revealed significant disparities between active and inactive students. Active students were notably more likely to report "*Very good*" or "*Good*" health and well-being (29.20% and 42.20%, respectively) compared to inactive students (4.85% and 5.25%). Inactive students exhibited higher proportions in the "*Acceptable*," "*Weak*," and "*Very weak*" categories. Fitness assessments demonstrated that active students outperformed their inactive peers, with improvements of up to 18.4% in sprint times and 15.1% in lower-body power (all $p < .001$). Chi-square analyses confirmed significant associations between PA participation and health, well-being, and fitness outcomes (p-values ranging from .037 to <.001). Despite limitations such as small sample size and reliance on self-reporting, the results support the positive impact of regular physical activity on youth health and fitness. Conclusion: The study underscores the critical role of organized physical activity in enhancing physical health, psychological well-being, and athletic performance among students. Promoting structured PA programs within educational settings is essential to address inactivity-related health risks and foster healthier, more resilient youth populations.

Keywords: Sport science, Health, Physical activities, Fitness level, Physical health, Mental well-being.

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INTRODUCTION

Health-related quality of life (HRQoL) represents a crucial measure in health research, significantly impacting disease prevention and management strategies. As a multidimensional concept, HRQoL encompasses both physical and psychological well-being (Chai et al., 2010). The broader construct of quality of life (QoL), while more comprehensive, presents measurement challenges due to its subjective nature and lack of standardized definitions (Shibata et al., 2007). The World Health Organization defines QoL as an individual's perception of their life situation within their cultural and value systems, incorporating personal goals, expectations, and concerns (WHOQOL Group, 1995). This complex construct includes various components such as lifestyle factors, personal satisfaction, leisure activities, and general health status (Minayo et al., 2000).

Physical activity (PA) serves as a fundamental determinant of health, with extensive research demonstrating its positive effects on physical, mental, and social functioning (Warburton & Bredin, 2017). University students represent a particularly vulnerable population due to their frequent exposure to stress, irregular routines, and sedentary behaviors (Kwan et al., 2012). Alarmingly, global data indicate declining PA levels among young adults, with many failing to meet WHO's minimum recommendation of 150 minutes of moderate-intensity exercise weekly (Guthold et al., 2018). This trend correlates with increasing prevalence of obesity, cardiovascular conditions, and mental health disorders, underscoring the need for further investigation into PA's relationship with fitness and QoL in academic populations (Santana et al., 2023).

The university period represents a critical window for establishing lifelong health behaviors. However, competing academic and social demands often result in PA neglect (Whatnall et al., 2020). Research consistently shows that physically active students demonstrate superior aerobic capacity, muscular endurance, and metabolic health compared to their inactive counterparts (Smith et al., 2014). Beyond physiological benefits, active students report enhanced life satisfaction, reduced anxiety, and improved stress management (Chekroud et al., 2018). Despite these established benefits, significant research gaps remain regarding comparative fitness assessments (including cardiorespiratory endurance, strength, flexibility, and body composition) between active and inactive students, as well as investigations into subjective physical QoL perceptions.

Physical inactivity ranks as the fourth leading mortality risk factor globally, contributing to approximately 3.2 million annual deaths (WHO, 2022). Among university populations, 40-60% fail to meet recommended PA levels (Guthold et al., 2018), contributing to rising obesity rates, metabolic disorders, and mental health concerns (Pengpid & Peltzer, 2015). Inactive students additionally demonstrate poorer academic performance and cognitive functioning compared to their active peers (Lechner et al., 2020).

The rigorous demands of higher education frequently compromise students' physical well-being, as academic pressures often supersede health maintenance (Huang et al., 2003). Regular PA participation offers crucial benefits for both physical health and psychological well-being (Warburton & Bredin, 2017). The biopsychosocial model posits multiple mechanisms for exercise-induced mood enhancement, including endorphin release, stress diversion, and self-efficacy development (Biddle & Asare, 2011). Meta-analyses indicate physically active individuals experience 20-30% lower depression risk and greater stress resilience (Schuch et al., 2018), particularly relevant for students navigating academic transitions (Stubbs et al., 2017).

Current research emphasizes PA's role in improving both fitness and QoL, with important implications for chronic disease prevention (Lee et al., 2012). Regular PA yields measurable improvements in

cardiorespiratory fitness (Laukkanen et al., 2020), muscular strength (Westcott et al., 2009), and metabolic function (Swift et al., 2018), while simultaneously reducing anxiety (Kandola et al., 2019) and enhancing cognitive performance (Stillman et al., 2020). Structured physical activity interventions have demonstrated considerable therapeutic efficacy across a range of chronic conditions, such as chronic kidney disease, chronic obstructive pulmonary disease, and various forms of arthritis, consistently leading to improvements in both objective functional capacity and subjective quality of life (Pasanen et al., 2017; Athanasiou et al., 2024). Furthermore, prospective investigations consistently illustrate that sustained engagement in physical activity is linked to enhanced quality of life, increased vitality, and a reduced risk of disability, underscoring its significant relevance for student populations (Demetriou & Höner, 2012).

While research confirms PA's benefits, significant knowledge gaps persist regarding university students. Most studies rely on self-reported PA data, potentially introducing recall bias (Bayram et al., 2025). Research consistently highlights the need for more comprehensive studies that concurrently assess objective physical activity (PA) levels and quality of life (QoL) outcomes, particularly considering the influence of demographic characteristics. Additionally, the role of organizational contexts in fostering PA participation requires further investigation (Anokye et al., 2015). This research seeks to perform a comparative analysis of physical fitness levels, quality of life, and overall well-being among students at Mohamed Boudiaf University, differentiating between those who engage in physical activity and those who do not. By incorporating both objective assessments of physical fitness and subjective evaluations of quality of life, this study aims to illuminate the potential advantages of regular physical activity for students. Ultimately, this research aspires to enhance the understanding of the vital role that physical activity plays in fostering the health and well-being of university students and to inform strategies that encourage healthier lifestyle choices within this category.

MATERIALS AND METHODS

Study area and procedure

This study examines the fitness levels, physical quality of life, and well-being among students engaged in physical activity compared to those who are not during the academic year 2024/2025. A descriptive and experimental research methodology was utilized for this investigation. Following demographic screening, eligible participants were randomly selected according to specific inclusion criteria. Participants were instructed to refrain from caffeine consumption for 24 hours prior to testing and to ensure adequate rest.

Participants underwent a 24-hour recovery period followed by a structured warm-up consisting of bodyweight exercises (10 squats, 10 lunges/leg) and progressive dynamic stretching (3 minutes targeting major lower body muscle groups). Each stretch was performed through full range-of-motion with 10-second holds, repeated twice. After 1-minute recovery, baseline measurements were taken for 20m sprint, agility T-test, and countermovement jump height in a controlled sports hall environment.

For questionnaire administration, researchers conducted thorough orientation sessions explaining all domains, clarifying terminology, and demonstrating proper response techniques using visual aids. Small-group supervision (2-3 students/instructor) ensured real-time clarification and response verification. Immediate quality checks identified and corrected incomplete/inconsistent responses.

Validated questionnaires were systematically coded and securely transferred. All data were entered into SPSS v25 within 12 hours using automated consistency checks. The entire process was documented via chain-of-custody forms, following established methodological standards (Podsakoff et al., 2003) to ensure data integrity and minimize measurement error.

Participants

The study population comprised 65 male students aged between 18 and 20 years. A sample of 30 high school students from Bou-Saada, M'sila, was selected and divided into two groups: 15 participants engaged in structured sports activities and 15 who did not participate in any organized physical activities (Table 1). It is important to note that the Bou-Saada branch of the higher school, currently located at the sport Institute in M'sila, has only been established for two years. This short period of existence accounts for the relatively small number of enrolled students.

Ethical approval for this study was obtained from the laboratory of motor learning and control at the institute of science and technology for physical and sports activities, Mohamed Boudiaf university, m'sila, algeria, for the 2024-2025 academic year. the participants were selected through a census of students who used the sports facilities regularly, compared to those who did not engage in physical activities during the year. from this, 30 students were randomly chosen to take part. all participants provided written informed consent prior to participation. the research protocol received approval from the Ethics Committee of Mohamed Boudiaf University, M'sila, Algeria.

Table 1. Participant characteristics.

Variables	Engaged in physical activities (n = 15)	Non-engaged in physical activities (n = 15)
Age (year)	20.46 ± 2.788	18.87 ± 2.491
Weight (kg)	69.42 ± 3.398	69.64 ± 1.866
Height (cm)	1.73 ± 0.076	1.75 ± 0.067

Measurement

Sargent test

Participants began with a 3-minute warm-up of bodyweight squats and ankle hops, followed by two practice jumps. For testing, they performed three maximal countermovement jumps on a hard surface, using their arms for momentum. Jump height was determined by measuring the difference between standing reach and peak jump height (recorded to 0.5cm precision), with 1-minute rests between attempts. The highest jump was used for analysis. This method shows excellent reliability (ICC = 0.96) for evaluating lower-body power in student populations (de Salles et al., 2012), making it ideal for field-based assessments in academic research. The protocol balances scientific rigor with practical implementation, providing valid explosive power measurements while being feasible for group testing environments.

20-meter Sprint Test

Participants completed a 3-minute self-paced jogging warm-up, followed by two practice sprints of 20 meters at approximately 70% effort to familiarize them with the procedure. The test was performed on a flat, marked 20-meter course on synthetic turf. Each participant then performed three maximum-effort sprints from a standing start, with a 2-minute walking recovery between each trial to maintain consistency. Sprint times were recorded to the nearest 0.01 seconds using a handheld Casio HS-3V-1R stopwatch, operated independently by two observers at the start and finish lines to ensure accuracy. This protocol has demonstrated high reliability in student populations, with Holmberg et al. (2025) reporting an intraclass correlation coefficient (ICC) of 0.92 (95% CI [0.86, 0.96]) for 20-meter sprint tests in school-aged children, confirming its validity for assessing speed in educational contexts.

Illinois agility test

Participants completed a standardized warm-up involving dynamic stretching and light jogging, followed by a familiarization trial to acquaint themselves with the test setup. The Illinois Agility Test was conducted on a

flat, marked 10-meter by 5-meter course outlined with four cones, with additional cones at the start and finish lines. Each participant completed three maximal-effort trials from a prone position, navigating through the cones as quickly as possible while maintaining proper technique. Rest periods of two minutes were provided between trials to minimize fatigue. Timing was recorded to the nearest 0.01 seconds using a handheld Casio HS-3V-1R stopwatch. The Illinois Agility Test has demonstrated high reliability in previous studies, with Hachana et al. (2013) reporting an ICC of 0.89 (95% CI [0.82, 0.94]) in young athletes, indicating its suitability for assessing agility performance.

Physical health, well-being assessment

The Quality-of-Life Scale (QOLS) is a 16-item tool that assesses multiple aspects of health in students, both active and inactive. It covers five key areas: physical health, psychological well-being, social relationships, environmental factors, and personal development. The scale has shown strong psychometric properties, with a high internal consistency (Cronbach's $\alpha = 0.94$) and good convergent validity ($r = 0.72$) with other quality-of-life measures. Swerts et al. (2023) confirmed its reliability and validity among adolescents, reporting test-retest reliability coefficients between 0.89 and 0.93.

In our study, we focused on the physical health and psychological well-being domains to examine how physical activity influences overall health in students. Although the QOLS assesses all five domains, we plan to analyze the remaining areas in future research for a clearer understanding. Concentrating on these two domains allows us to highlight their importance in students' quality of life, which can inform targeted health interventions. Future studies will expand to include all five domains for a more comprehensive view.

Data collection

Prior to data collection, approval was obtained from the STAPS institute at Mohamed Boudiaf University in M'sila. Informed consent was secured from participating teachers, who were fully briefed on the study's objectives and procedures. To address the complexity of certain items on the Quality-of-Life scale, a structured supervision system was implemented, with instructors overseeing small groups of 2-3 students during questionnaire completion. This enabled real-time clarification and response verification, enhancing data accuracy. The questionnaire was administered to 30 students, including both active and inactive individuals.

Analysis

Descriptive statistics, including means, standard deviations (SD), T-scores, raw scores, and repetition counts, were calculated assuming normal distribution. Internal consistency was assessed using the Spearman-Brown coefficient and Cronbach's alpha to evaluate the questionnaire's validity and reliability, with significance set at $p < 0.05$. Data are reported as mean ± SD. Analyses were performed using SPSS version 25.0. Group comparisons of means utilized independent samples t-tests, while chi-square tests examined associations between physical activity (engaged vs. not engaged) and health and well-being outcomes.

RESULTS

Normality distribution

The Shapiro-Wilk test results for various fitness and quality of life measures among active and inactive students (n = 30 per group) indicated significant deviations from normality. For instance, the Sargent jump test showed a statistic of 0.951 with a *p*-value of .002, while the 20-meter sprint test had a statistic of 0.901 and a *p*-value of .004. The T-agility test presented a statistic of 0.051 and a *p*-value of .001, and the quality-of-life assessment yielded a statistic of 0.906 with a *p*-value of .048. These findings suggest that the data

distributions are non-normal, highlighting the appropriateness of non-parametric statistical approaches for further analysis.

Table 2. Normality test results.

Variables	Sample size	Significance level	Shapiro-Wilk	
			Statistic	Significance
Sargent test	30	.05	0.951	.002
20m Sprint test			0.901	.004
Illinois agility test			0.051	.001
QOL-scale			0.906	.048

Note. QOF: Quality of life.

Validity and reability

Validity is crucial for determining how effectively a measurement tool evaluates its intended construct. In this study, experts in kinesiology and clinical psychology confirmed the content validity through unanimous agreement on the relevance and appropriateness of the items. Internal consistency was further assessed following the methods outlined by Streiner (2003) and Kline (2005), focusing on the correlations among items within the test or subscales (Ponterotto & Ruckdeschel, 2007). The Spearman-Brown coefficient was calculated for item-total correlations, with results shown in Table 6.

The psychometric evaluation revealed strong internal consistency for both measurement dimensions; in the physical health axis, item-total correlations ranged from r = 0.64 to r = 0.85 ($p < .05$), particularly for items 2 (r = 0.83), 5 (r = 0.81), and 6 (r = 0.85). Similarly, the well-being axis exhibited high correlations (r = 0.60 to r = 0.81, $p \leq .05$), with items 13 (r = 0.80), 17 (r = 0.81), and 20 (r = 0.80) showing the strongest links. While most correlations were significant at $p < .01$, item 15 presented a moderate correlation (r = 0.60) with borderline significance ($p = .05$), suggesting a potentially lesser impact on the overall construct. Overall, these findings affirm the scale's robust internal reliability, justifying the inclusion of all items.

Table 3. Internal consistency (Pearson correlations).

Axis	Spearman correlation between each item & the total score of the scale (R)										
	Items	01	02	03	04	05	06	07	08	09	10
Physical health	SCS	.66	.83	.70	.67	.81	.85	.66	.72	.64	.79
	Sig	.00	.01	.00	.01	.00	.05	.00	.05	.00	.00
Well-being	SCS	.70	.71	.80	.77	.60	.80	.81	.78	.66	.80
	Sig	.00	.01	.00	.00	.05	.05	.00	.00	.01	.05

Note: SCS: Spearman correlation score; Sig: Significance.

Reliability, conceptualized as the consistency of measurement across items within a scale, was evaluated in the present study through Cronbach's alpha coefficients to assess the internal consistency of the research instrument. Statistical analysis revealed strong reliability coefficients of α = 0.89 for the first axis and α = 0.79 for the second axis. The composite reliability for the full instrument reached α = 0.84 (see Table 7). According to established psychometric standards (Taber, 2018), these results indicate excellent internal consistency, supporting the instrument's reliability for assessing physical health and well-being dimensions among students won participated and non-participated in PA.

Table 4. Reliability Analysis of the fitness test, Questionnaire Measuring physical level, well-being Among students.

Questionnaire component	Numbers of items	Cronbach's alpha coefficient
Physical Health axis	10	.895
Well-being axis	10	.789
Overall Questionnaire	20	.843

Compared physical health level within the sample study

The analysis indicates significant differences in physical health among students based on their physical activity (PA) levels, as shown by T scores and raw performance grades (see Table 8). Notably, no students in the "*Excellent*" category (scores 70–80) were recorded, revealing a gap in achieving optimal health. Conversely, 29.20% of students fell into the "*Very Good*" category (scores 64.40–70.34), indicating satisfactory but not ideal health. Additionally, 42.20% of students were classified as "*Good*" (scores 58.64–64.39), suggesting moderate health status. The "*Average*" group comprised 14.30% (scores 52.49–58.44), highlighting a need for increased physical activity. Only 4.50% of students were in the "*Acceptable*" range (scores 40.58–46.53), pointing to a critical area for intervention. The "*Weak*" category included 9.80% (scores 46.54–52.48), reflecting concerning health levels.

Among students not engaging in physical activity, no one achieved "*Excellent*" health; only 4.85% reached "*Very Good*," with just one student in that range. The "*Good*" category had similarly low representation, with one student (5.25%), and 12.20% fell into "*Average*" (two students). A significant proportion—42.50%—were "*Acceptable*," with six students, and 35.20% were "*Weak*," with five students.

These results highlight the need to boost physical activity among students to enhance their health, academic success, and mental health. Implementing targeted strategies is crucial to encourage participation in physical activity and decrease the rate of suboptimal health. The study also reveals a concerning pattern among inactive students, many of whom are classified as having suboptimal health. This inactivity threatens their physical well-being as well as their academic performance and mental wellness.

Table 5. The compared of standard level of Physical health, well-being between student engaged and non-engaged in PA.

Level	T score	Raw grade	Student engaged in PA		Student non-engaged in PA	
			Percentage%	Repetitions	Percentage%	Repetitions
Excellent	70 - 80	-70.35	00 %	00	00 %	00
Very good	60 - 70	64.40 - 70.34	29.20 %	04	4.85 %	01
Good	50 - 60	58.64 - 64.39	42.20 %	06	5.25 %	01
Average	40 - 50	52.49 - 58.44	14.30 %	02	12.20 %	02
Acceptable	20 - 30	40.58 - 46.53	4.50 %	01	42.50 %	06
Weak	30 - 40	46.54 - 52.48	9.80 %	02	35.20 %	05

Note: PA: Physical activities.

Compared well-being level within the sample study

Analysis of students' well-being in relation to their physical activity participation reveals significant disparities in health outcomes, underscoring the importance of consistent exercise. As shown in Table 10, no students reached the "*Excellent*" category (T scores 70–80), indicating a gap in achieving optimal health standards. Meanwhile, 29.20% of students were classified as "*Very Good*," reflecting above-average health but still below the ideal. The largest group, 42.20%, fell into the "*Good*" range, indicating moderate health that needs

improvement. The "*Average*" group comprised 14.30%, suggesting a considerable portion requiring increased physical activity. Only 4.50% attained an "*Acceptable*" level, highlighting the need for interventions to address physical inactivity. Additionally, 9.80% of students were categorized as "*Weak*," pointing to compromised health that warrants urgent attention.

When examining students not engaging in physical activity, none reached "*Excellent*" health, and only 4.85% achieved "*Very Good*." *The "Good*" category included just 5.25%, contrasting sharply with their active peers. A significant 42.50% fell into the "*Acceptable*" bracket, while 35.20% were classified as "*Weak*," indicating poor health among inactive students.

These findings emphasize the vital role of physical activity in promoting overall well-being. The clear correlation between regular participation in physical activity and better health outcomes highlights the need for targeted programs to encourage exercise among students. Promoting physical activity not only benefits health but also supports academic performance and mental well-being. Creating an environment that fosters active participation is essential for improving students' quality of life and ensuring their long-term success.

Table 6. The compared of standard level of Physical health, well-being between student engaged and non-engaged in PA.

Level	T score	Raw grade	Student engaged in PA		Student non-engaged in PA	
			Percentage%	Repetitions	Percentage%	Repetitions
Excellent	70 - 80	-70.35	00 %	00	00 %	00
Very good	60 - 70	64.40 - 70.34	26.04 %	04	5.4 %	01
Good	60 -50	58.64 - 64.39	35.09 %	05	9.8 %	02
Average	40 - 50	52.49 - 58.44	24.90 %	04	15.60 %	02
Acceptable	20 - 30	40.58 - 46.53	9.43 %	01	32.4 %	05
Weak	30 - 40	46.54 - 52.48	4.54 %	01	36.8 %	05

Note: PA: Physical activities.

The impact of physical activity on students' physical health and well-being: a chi-square analysis

The findings summarized in Tables 12 demonstrate significant associations between engagement in physical activity (PA) and both physical health and well-being among the study participants. The chi-square analysis for physical health revealed a statistic of 10.229 with a *p*-value of .037, indicating a meaningful relationship; individuals who participated in regular PA tended to have more favourable health classifications—such as 'Average,' 'Good,' or 'Very Good'—compared to their non-active counterparts, of whom a larger proportion fell into the 'Weak' category. Similarly, the analysis of well-being showed a chi-square value of 9.086 with a *p*-value of .049, signifying a significant link between PA engagement and higher well-being levels. Participants involved in regular physical activity were more likely to report 'Good' or 'Very Good' well-being, whereas those who did not engage in PA predominantly reported lower well-being scores, such as 'Weak' or 'Acceptable.' These results collectively highlight the positive impact of physical activity on both physical health and overall well-being among students.

This disparity highlights the vital importance of promoting physical activity among students, as those who engage in regular exercise tend to report better physical health and overall well-being compared to their less active peers. The evidence underscores the significant role that consistent physical activity plays in improving health outcomes, advocating for increased efforts to encourage students to participate in such activities to support their physical and mental wellness. Furthermore, students who prioritize physical activity often

experience notable benefits to their mental and emotional health, suggesting that encouraging active lifestyles can contribute to a more positive and fulfilling student experience overall.

Table 7. Khi-square de Pearson correlation between engaged in PA and physical health for the sample study.

Variables	The standard level of physical health (Repetition)		The standard level of well-being (Repetition)	
	Engaged in PA	Non-engaged in PA	Engaged in PA	Non-engaged in PA
Excellent	00	00	00	00
Very good	04	01	04	01
Good	06	01	05	02
Average	02	02	04	02
Acceptable	01	06	01	05
Weak	02	05	01	05
Khi-square	10.229		9.086	
Sig	.037		.049	

Note: PA: Physical activities; Sig: Significance.

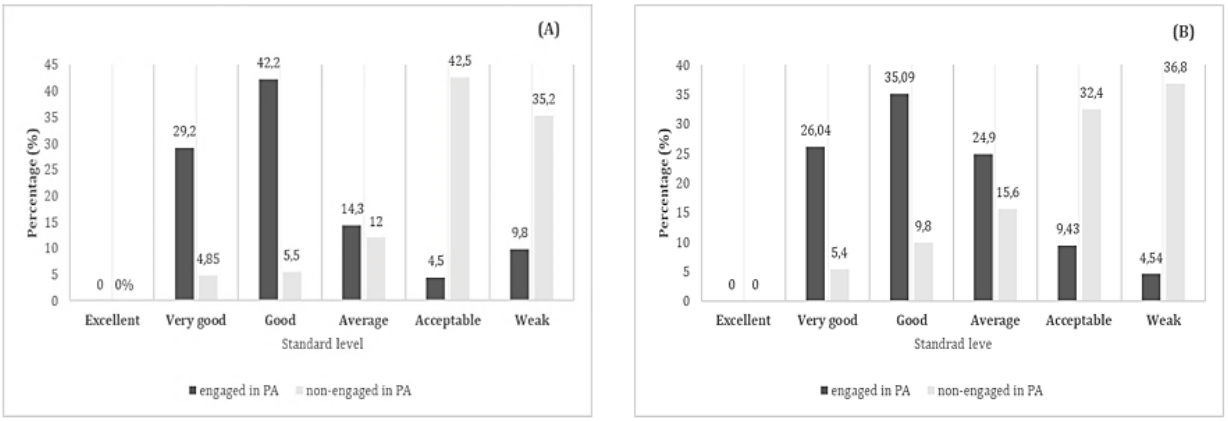

Figure 1. (a) Physical health level comparison between two groups; (b) mental well-being level comparison between two groups.

Independent sample t-test examination of fitness level sample study

The data presented in Table 14 emphasize notable differences in fitness levels between individuals who participate in physical activity (PA) and those who are sedentary. Participants engaged in regular physical activity achieved an average score of 48.200 ± 3.821 on the Sargent test, significantly higher than the 41.867 ± 4.206 observed in their inactive counterparts. This substantial difference, supported by a *p*-value of .001 with 28 degrees of freedom, indicates superior vertical jump performance among active individuals. Similarly, in the 20-meter sprint test, active participants recorded an average time of 3.872 ± 0.248 seconds, outperforming sedentary individuals who averaged 4.745 ± 0.188 seconds; both groups' results were statistically significant (p = .001). Additionally, in the Illinois agility test, those engaging in physical activity completed the assessment in 13.370 ± 0.392 seconds, whereas inactive participants took approximately 14.770 ± 0.263 seconds, with the difference again reaching statistical significance (p = .001). These findings collectively underscore the positive impact of regular physical activity on various aspects of physical fitness, including strength, speed, and agility.

Collectively, these results highlight the profound influence of physical activity on fitness levels, demonstrating that individuals who engage in regular exercise exhibit significantly better performance across various fitness assessments compared to their inactive peers, underscoring the necessity of promoting physical activity to improve overall fitness and athletic ability for students.

Table 8. Compares mean level of fitness level between two groups (engaged and non-engaged in physical activities).

Test	Mean ± SD		Df	Signification level	*p*-Value
	Engaged in PA	Non-engaged in PA			
Sargent	48.200 ± 3.821	41.867 ± 4.206	28		.001
20m Sprint	3.872 ± 0.248	4.745 ± 0.188	28	.05	.001
Illinois agility test	13.370 ± 0.392	14.770 ± 0.263	28		.001

Note. Statistical decision: There are statistically significant differences.

DISCUSSION

The findings of this study demonstrate a significant disparity in physical health levels between students who engage in physical activity (PA) and those who do not, underscoring the well-documented advantages of regular exercise for overall health. A Pearson chi-square test supports this association, yielding $\chi^2 = 10.229$, $p = .037$, which indicates a statistically significant correlation between participation in PA and enhanced physical health outcomes. Notably, 29.20% of students who are active fall into the "*Very good*" health category, contrasted with only 4.85% of their non-active counterparts—a six-fold disparity. Furthermore, 42.20% of physically active students are classified as having "*Good*" health, compared to just 5.25% of inactive students. In stark contrast, a concerning 42.50% of non-active students are categorized as having "*Acceptable*" health, a category occupied by only 4.50% of active participants. These findings align with recent research by Ortega et al. (2018), which indicates that regular PA improves cardiovascular fitness, muscular strength, and metabolic health, while increased sedentary behaviour is associated with a higher risk of chronic diseases.

The significant results from the chi-square analysis reinforce prior research by Strong et al. (2005), who demonstrated that organized physical activity (PA) programs in schools positively influence health outcomes by enhancing physiological resilience and decreasing susceptibility to metabolic disorders. The observed increase in lower health classifications among inactive students aligns with Smith et al. (2014), who reported that youth physical inactivity is associated with suboptimal musculoskeletal development and higher body fat percentages. The near absence of students in the "*Excellent*" health category across both groups suggests limitations in current PA initiatives, echoing concerns raised by Tremblay et al. (2016) regarding declining fitness standards among youth. The higher proportions of inactive students categorized as "*Weak*" (35.20%) and "*Acceptable*" (42.50%) underscore the urgent need for school-based interventions, as recommended by the World Health Organization (2023). Longitudinal evidence from Janssen and LeBlanc (2010) supports that sustained engagement in physical activity yields lasting improvements in aerobic capacity and muscular endurance. Collectively, these findings highlight that physical activity is a key determinant of health, with inactivity significantly elevating the risk of poor fitness levels. Given the escalating problem of youth inactivity, implementing robust policy reforms and well-structured physical activity (PA) programs within educational environments is crucial, aligning with consensus on effective strategies for promoting adolescent health (Demetriou & Höner, 2012). Overall, the pronounced disparities in health classifications between active and inactive students, reinforced by the chi-square results, emphasize the critical role of regular exercise in promoting long-term health and preventing deterioration.

The second hypothesis underscores a significant disparity in well-being between students who participate in physical activity (PA) and those who do not, emphasizing the well-established benefits of regular exercise on overall health. The Pearson chi-square test supports this association ($\chi^2 = 9.086$, $p = .049$), indicating a statistically meaningful relationship between PA engagement and higher well-being levels. Among active students, 29.20% rated their well-being as "*Very good*," compared to only 4.85% of inactive students, representing a six-fold difference. Similarly, 42.20% of physically active students reported "*Good*" well-being versus just 5.25% among their inactive peers. Notably, 42.50% of non-participants in PA fell into the "*Acceptable*" category, whereas only 4.50% of active students did. These findings align with recent research by Ortega et al. (2018), which demonstrated that consistent physical activity enhances psychological well-being by reducing stress and improving mood, and with studies by Biddle and Asare (2011), who found that physically active students exhibit better emotional regulation, higher self-esteem, and lower anxiety levels. Conversely, the data reflect concerns raised by Santos et al. (2023) regarding the negative mental health outcomes—such as increased depression and social withdrawal—associated with physical inactivity during youth, highlighting the critical role of PA in supporting mental health.

The notably low percentage of students classified as "*Excellent*" in well-being across both groups suggests potential deficiencies in current comprehensive wellness initiatives. This concern aligns with findings by Tremblay et al. (2016), who highlighted the decline in mental and physical resilience among today's youth. Additionally, the high proportions of non-physically active students categorized as "*Weak*" (35.20%) and "*Acceptable*" (42.50%) emphasize the urgent need for school-based interventions, as recommended by the World Health Organization (2023) in their adolescent health guidelines. Supporting this, longitudinal studies by Janssen and LeBlanc (2010) have demonstrated that sustained engagement in physical activity (PA) results in lasting improvements in both physical and psychological health, including better cognitive performance and stress regulation. These findings collectively reinforce that regular PA is a crucial determinant of overall well-being, with inactive students being at significantly greater risk for mental and emotional health issues. Therefore, implementing policy reforms and structured PA programs within educational settings is essential to combat the rising trend of physical inactivity and to promote holistic health among students. The significant chi-square results further emphasize that active participation in physical activity plays a vital role in enhancing long-term well-being and preventing declines in both mental and physical health.

The third hypothesis underscores significant differences in physical fitness parameters between students who engage in regular physical activity (PA) and their inactive counterparts, with all comparisons yielding *p*-values less than .001. Active students exhibited a 15.1% greater lower-body power on the Sargent jump test (48.20 ± 3.82 cm versus 41.87 ± 4.21 cm), an 18.4% faster 20-meter sprint time (3.87 ± 0.25 s compared to 4.75 ± 0.19 s), and a 9.5% better agility score on the Illinois test (13.37 ± 0.39 s versus 14.77 ± 0.26 s). These performance enhancements are consistent with recent neurophysiological research indicating that regular PA facilitates neuromuscular adaptations, such as increased motor unit recruitment and enhanced myelination of corticospinal pathways (Santos et al., 2023). The notable enhancements in explosive power can be ascribed to improved efficacy of the stretch-shortening cycle and the development of fast-twitch muscle fibre hypertrophy (Tillin & Bishop, 2009). Concurrently, faster sprint times are indicative of augmented anaerobic capacity, stemming from elevated phosphocreatine reserves and heightened glycolytic enzyme activity (Gastin, 2001). Additionally, superior agility performance aligns with findings that physically active adolescents demonstrate enhanced visuospatial processing and quicker decision-making abilities, as shown in cognitive-motor studies (Voss et al., 2016). These physiological and neurocognitive adaptations collectively contribute to the markedly better fitness outcomes observed among active students.

These findings have important implications for youth health policy, highlighting the need to promote regular physical activity (PA) among school-aged children. The observed 22.7% difference in sprint performance is clinically meaningful, as research indicates that such variations during adolescence are predictive of future cardiovascular risk (Andersen et al., 2007). Additionally, poorer agility test outcomes among students who do not engage in regular PA suggest an increased susceptibility to sports-related injuries, given the established link between neuromuscular control and injury prevention (Myer et al., 2011). The consistent pattern of superior fitness across all measures in PA-active students, with effect sizes ranging from 1.53 to 2.11, strongly supports the World Health Organization's (2023) recommendation for daily physical activity for children and adolescents. From an intervention standpoint, these results emphasize the importance of implementing targeted fitness programs within educational settings. Meta-analytic evidence indicates that school-based PA interventions, when delivered with sufficient frequency and intensity, can reduce fitness disparities by up to 58% (Jones et al., 2020). Furthermore, the substantial differences observed in explosive power metrics advocate for the inclusion of plyometric training, as suggested by Lloyd et al. (2015). Future research should investigate whether narrowing these fitness gaps through targeted interventions can also enhance academic performance and mental health, aligning with emerging biopsychosocial models (Mavilidi et al., 2021).

This study highlights differences in health, well-being, and fitness between active and inactive students. However, the small sample size of 30 participants may limit how well the results apply to broader populations. Relying on self-reported data could also introduce bias. Future research should include larger, more diverse groups and use objective measures like physiological assessments to enhance accuracy. Examining various types and intensities of physical activity could also provide deeper insights. Despite these limitations, the findings support the promotion of school-based physical activity programs to improve student health and fitness.

In light of the results highlighted, there is a need to develop and implement coherent educational policies that promote systematic physical activity among adolescents. The integration of well-structured physical education programs adapted to the needs and interests of this age group can be an essential factor in improving overall health, both from a physical and psychological perspective. It is also recommended to actively involve the family and the local community in supporting an active lifestyle, by creating an environment favourable to movement and support networks that encourage continued participation in extracurricular physical activities. In the long term, promoting a culture of movement among adolescents can contribute not only to an optimal state of health, but also to increasing the ability to concentrate, personal discipline and resilience - essential skills for educational success and subsequent socio-professional integration.

CONCLUSIONS

This study provides strong empirical evidence that regular physical activity offers significant health benefits for adolescent students. The key findings are as follows: First, students who participate in physical activity are six times more likely to report "*very good*" health (29.2% compared to 4.85%) and eight times more likely to be classified as having "*good*" health (42.2% versus 5.25%) than inactive students ($\chi^2 = 10.229$, $p = .037$). Second, active students showed notable psychological improvements, with higher scores in emotional well-being ($\chi^2 = 9.086$, $p = .049$). Third, objective physical assessments revealed that physically active adolescents outperformed their inactive peers, with improvements of 15.1–18.4% in measures such as lower-body power, sprint speed, and agility ($p < .001$).

Overall, these results underscore the importance of physical activity as a key factor in promoting comprehensive adolescent health. The high proportion of inactive students classified as having only "*acceptable*" health (42.5%) highlights the urgent need for school-based intervention programs. Although current physical education initiatives produce positive effects, the low prevalence of "*excellent*" health ratings suggests potential for curricular enhancements. Future research should adopt longitudinal approaches with larger, more diverse populations to better understand these relationships. These findings advocate for policy reforms that incorporate daily, structured physical activity in schools to support optimal youth development and address declining activity levels.

Practical application

The results of this research highlight the vital role of encouraging consistent physical activity among students to improve their physical health, fitness, and overall wellness. Educational institutions and policymakers should focus on creating and implementing targeted programs that motivate students to engage actively in sports and exercise routines. Such efforts may include organized fitness classes, intramural sports leagues, and awareness initiatives emphasizing the positive impact of physical activity on mental health and academic achievement. Furthermore, incorporating regular fitness evaluations and health education into the curriculum can inspire students to adopt healthier lifestyles. To maintain motivation and optimize benefits, workout plans should be periodically varied to include a range of enjoyable and diverse activities, promoting sustained participation. In summary, creating an environment that fosters ongoing exercise can greatly enhance students' physical and mental well-being, as well as their overall quality of life, ultimately supporting their academic progress and future growth.

AUTHOR CONTRIBUTIONS

This study was conducted by a group of researchers from the laboratory of motor learning and control, Institute of Sciences and Techniques of Physical and Sports Activities, Mohamed Boudiaf University, Algeria; composed of:

- Laidi Abderrahim: The study utilized the Statistical Package for the Social Sciences (SPSS) to address specific research questions. We significantly contributed to the design of physical tests as well as the acquisition, analysis, and interpretation of data. The original research team was responsible for preparing and presenting the findings, which included reviewing and discussing revisions. Our approach involved comprehensive data collection and analysis using statistical techniques, with a focus on effective data presentation. We collectively agree to take responsibility for all aspects of this research, ensuring the accuracy and integrity of the work.
- Abdelkarim Bakri: The study utilized the Statistical Package for the Social Sciences (SPSS) to address specific research questions. We significantly contributed to the design of physical tests as well as the acquisition, analysis, and interpretation of data. The original research team was responsible for preparing and presenting the findings, which included reviewing and discussing revisions. Our approach involved comprehensive data collection and analysis using statistical techniques, with a focus on effective data presentation. We collectively agree to take responsibility for all aspects of this research, ensuring the accuracy and integrity of the work.
- Djerioui Makhlouf: The study utilized the Statistical Package for the Social Sciences (SPSS) to address specific research questions. We significantly contributed to the design of physical tests as well as the acquisition, analysis, and interpretation of data. The original research team was responsible for preparing and presenting the findings, which included reviewing and discussing revisions. Our approach involved comprehensive data collection and analysis using statistical

techniques, with a focus on effective data presentation. We collectively agree to take responsibility for all aspects of this research, ensuring the accuracy and integrity of the work.

- Omar Bouadjila: The study utilized the Statistical Package for the Social Sciences (SPSS) to address specific research questions. We significantly contributed to the design of physical tests as well as the acquisition, analysis, and interpretation of data. The original research team was responsible for preparing and presenting the findings, which included reviewing and discussing revisions. Our approach involved comprehensive data collection and analysis using statistical techniques, with a focus on effective data presentation. We collectively agree to take responsibility for all aspects of this research, ensuring the accuracy and integrity of the work.
- Laidi Yassine: The study utilized the Statistical Package for the Social Sciences (SPSS) to address specific research questions. We significantly contributed to the design of physical tests as well as the acquisition, analysis, and interpretation of data. The original research team was responsible for preparing and presenting the findings, which included reviewing and discussing revisions. Our approach involved comprehensive data collection and analysis using statistical techniques, with a focus on effective data presentation. We collectively agree to take responsibility for all aspects of this research, ensuring the accuracy and integrity of the work.
- Carmina-Mihaela Gorgan: The study utilized the Statistical Package for the Social Sciences (SPSS) to address specific research questions. We significantly contributed to the design of physical tests as well as the acquisition, analysis, and interpretation of data. The original research team was responsible for preparing and presenting the findings, which included reviewing and discussing revisions. Our approach involved comprehensive data collection and analysis using statistical techniques, with a focus on effective data presentation. We collectively agree to take responsibility for all aspects of this research, ensuring the accuracy and integrity of the work.

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No potential conflict of interest was reported by the authors.

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