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Characterization of physical fitness in medical science students, Palma Soriano

Caracterización de la aptitud física en estudiantes universitarios de ciencias médicas, Palma Soriano

Katia Abón Guerra[1] 🔟 ✉, Juan Leonardo Pacios Dorado[2] 🔟 ✉, Christian José Arencibia Pagés[3] 🔟 ✉, Mayenin Fuentes Tur[1] 🔟 ✉, Yaimara González Puig[1] 🔟 ✉, Raiza Fernández Sosa[1] 🔟 ✉

[1]Universidad de Ciencias Médicas Santiago de Cuba, Filial de Ciencias Médicas "Julio Trigo López", Palma Soriano, Santiago de Cuba, Cuba.
[2]Universidad de Ciencias Médicas La Habana, Facultad "Calixto García", La Habana, Cuba.
[3]Universidad de Ciencias Médicas de Camagüey, Facultad de Ciencias Médicas, Camagüey, Cuba.

ABSTRACT

Introduction: physical fitness constitutes an inherent human ability to perform bodily tasks effectively. Academic demands in university often hinder dedication to extracurricular exercise due to the persistent fatigue and pressure generated by the academic workload.
Objective: to evaluate the physical fitness of university students at the "Julio Trigo López" Medical Sciences Branch in Palma Soriano.
Method: an analytical study was conducted among students at the "Julio Trigo López" Medical Sciences Branch in Palma Soriano during March 2025. The population comprised all 387 students of the institution, with the entire group included in the study. Descriptive and inferential statistics were utilized.
Results: the predominant age group was 21 years (26,87 %). Gender distribution was balanced with a slight male predominance (51,16 %), and the most represented academic year was the 3rd (23 %). Normal weight prevailed, with 200 students (51,68 %). Statistical significance tests between BMI classification and physical fitness showed a significant association (x^2=78,91; p<0,001), with a likelihood ratio of 81,23 (df=5; bilateral asymptotic significance=0,000). Only 60,72 % of students were classified as physically fit.
Conclusions: although most students demonstrated physical fitness, the high percentage of non-fit individuals constitutes a relevant problem. The statistically significant relationship between body mass index and functional capacity indicates that excess weight compromises physical performance.

Keywords: Physical Fitness; Medical Students; Medical Schools.

RESUMEN

Introducción: la aptitud física constituye una habilidad inherente del ser humano para ejecutar tareas corporales con eficacia. Las demandas académicas en la universidad frecuentemente dificultan la dedicación al ejercicio extracurricular, debido a la fatiga y presión constante que genera la carga lectiva.
Objetivo: evaluar la aptitud física en estudiantes universitarios de la Filial de Ciencias Médicas "Julio Trigo López" de Palma Soriano.
Método: se realizó un estudio analítico en estudiantes de la Filial de Ciencias Médicas "Julio trigo López" de Palma Soriano durante marzo de 2025. El universo lo constituyeron 387 estudiantes de la institución universitaria, trabajándose con la totalidad. Se utilizó estadística descriptiva e inferencial.
Resultados: predominó el grupo etario de 21 años (26,87 %). Hubo equilibrio de género con ligero predominio masculino (51,16 %), y el año académico más representado fue el 3° (23 %). Predominó el peso normal con

200 estudiantes (51,68 %). Las pruebas de significación estadística entre la clasificación del IMC y la aptitud física mostraron una asociación significativa (x^2=78,91; p<0,001), con razón de verosimilitud de 81,23 (gl=5; significación asintótica bilateral=0,000). Solo el 60,72 % de los estudiantes fue clasificado como físicamente apto.

Conclusiones: aunque la mayoría de los estudiantes mostró aptitud física, el elevado porcentaje de no aptos constituye un problema relevante. La relación estadísticamente significativa entre el índice de masa corporal y la capacidad funcional evidencia que el exceso de peso compromete el rendimiento físico.

Palabras clave: Aptitud Física; Estudiantes; Facultades de Medicina.

INTRODUCTION

Physical activity and exercise, although related to physical fitness, are concepts that are often used synonymously. The scientific literature recognizes the fundamental importance of physical activity for human development, optimal functioning, and overall well-being. From a biomedical perspective, its evaluation often focuses on its absence: physical inactivity, recognized as the fourth leading risk factor for mortality globally.[1]

By the mid-20th century, a definition of physical fitness had been established as the biological basis of an ability determined by growth, exercise, and, in some cases, formal education. This conceptual advance allowed for its direct assessment, an understanding of its development as a continuous process, and its targeted improvement in various population groups with specific objectives.[2]

There is consensus that physical fitness represents an individual's ability to perform physical activities, whether work-related or sports-related, effectively and without excessive fatigue. This ability involves the integration of biological and psychological processes, including skills and predispositions.[2]

The intense university life, marked by stress and exhaustion, especially during exam periods, often limits the time available for extracurricular activities. The associated anxiety leads many students to neglect healthy habits. In recent years, there has been a notable increase in metabolic disorders among young university students, attributable to psychological, social, and cultural factors. This phenomenon, combined with a sedentary lifestyle and inadequate nutrition, has caused significant changes in body composition.[3]

Theoretical evidence supports the idea that physical exercise has a powerful influence on previously underestimated dimensions. This includes the modulation of emotional states such as anxiety and depression, stress reduction, and the improvement of intellectual and cognitive abilities, effects supported by functional changes derived from regular sports and physical activity.[4]

International recommendations are emphatic: they urge policymakers in higher education institutions to invest in the promotion of physical activity. Ensuring an environment that encourages regular exercise requires both favorable conditions and the implementation of specialized programs, which demands investment or adjustments on the part of the authorities. This investment, however, can generate significant added value for society and reinforce the strategic role of educational institutions in the country.[1]

Assessing the quality of physical fitness in university students is crucial. This is particularly relevant for medical students, who often face higher stress levels than other disciplines due to the high academic demands and their early involvement in healthcare settings. For these reasons, this study was conducted with the aim of evaluating the physical fitness of university students at the Julio Trigo López Medical Sciences Branch in Palma Soriano.

METHOD

An observational analytical study was conducted at the Julio Trigo López Medical Sciences Branch in Palma Soriano, part of the University of Medical Sciences in Guantánamo, during the month of March 2025.

The study population consisted of 387 medical students from the aforementioned branch. The entire population was included, constituting a census sample. The inclusion criteria were: being a student enrolled in the medical program at the branch during March 2025 and providing informed consent. The exclusion criteria were: students on university leave or with an active medical certificate during the study period. The exit criteria were: voluntary withdrawal from the study, withdrawal of informed consent, or inability to complete the required measurements.

The variables analyzed were: age, sex, academic year, body mass index (BMI), and physical fitness. BMI was determined using Adolphe Quetelet's formula[5] (weight in kilograms divided by height in meters squared) and classified according to the reference values established by the World Health Organization (WHO). Physical fitness was categorized using the PAR^{-Q} questionnaire, which consists of seven questions. Any student who answered yes to at least one of the seven questions in the questionnaire was considered "physically unfit"; otherwise, they

were classified as "physically fit."

Data collection was carried out using a form developed by the authors, designed to record sociodemographic variables and PAR-Q results. This instrument was validated by expert judgment (three methodologists and clinical researchers) who evaluated its relevance and clarity, followed by a pilot test with 30 students not included in the final sample to adjust comprehension. For BMI, weight and height were measured with a scale with a fixed height gauge with an accuracy of 0,1 cm, following a standardized protocol: measurements were taken in the morning, with participants wearing light clothing, without shoes, in a standard anthropometric position (facing the Frankfort plane). The PAR-Q[5] questionnaire is an internationally recognized instrument for initial assessment of physical fitness.

Data collection was performed through face-to-face interviews by researchers using a validated form. Anthropometric measurements were taken in a specially equipped classroom, maintaining privacy and controlled environmental conditions (temperature, lighting). All data were recorded immediately and stored anonymously in a digital database created specifically for the study.

The data were processed using SPSS version 23. Descriptive statistics were applied (absolute/relative frequencies in percentages for categorical variables; mean and standard deviation for continuous variables such as age and BMI). Inferential analysis used Pearson's chi-square test to evaluate the association between BMI categories (underweight, normal, overweight, obese) and physical fitness (fit/unfit), with a significance level of $p < 0,05$.

The study was approved by the Scientific Council and Institutional Ethics Committee. The principles of the Declaration of Helsinki were followed, requesting verbal and written informed consent prior to participation. The objectives, procedures, minimal risks, and the right to withdraw without consequences were explained. Confidentiality was ensured through data coding and restricted access to researchers. The results will be used exclusively for scientific purposes.

RESULTS

The highest concentration is at age 21 (26,87 %), with gender balance (51,16 % men). The intermediate academic years (2nd-4th) account for 61 % of the total , with the 3rd year standing out (23 %), while the 1st and 6th years show lower participation (14,21 % and 9,82 % respectively) (tabla 1).

Table 1. Distribution of students by age, gender, and academic year		
Variable	**No**	**%**
Age		
19	42	10,85
20	86	22,22
21	104	26,87
22	78	20,16
23	52	13,44
24	25	6,46
Gender		
Male	198	51,16
Female	189	48,84
Academic year		
1	55	14,21
2	71	18,35
3	89	23
4	76	19,64
5	58	14,99
6	38	9,82

Most students (51,68 %) were of normal weight, followed by 25,84 % who were overweight (grade I). It is noteworthy that almost 1 in 10 students (10,34 %) were overweight (grade II). Only 2,58 % were underweight (table 2).

Table 2. Distribution of students according to BMI classification		
BMI Classification	No.	%
Type I obesity	30	7,75
Type II obesity	7	1,81
Underweight	10	2,58
Normal weight	200	51,68
Grade I overweight	100	25,84
Grade II overweight	40	10,34
Total	387	100

A clear trend was observed, with students of normal weight recording the highest rate of physical fitness (41,34 %). In contrast, in the obesity groups (types I and II), more than 8 % were unfit. Overall, only 60,72 % of students were classified as fit (table 3).

Table 3. Distribution of students according to BMI classification and physical fitness				
BMI classification		Physical Fitness		Total
		Fit	Not fit	
Type I obesity	No	6	24	30
	%	1,55	6,20	7,75
Type II obesity	No.	1	6	7
	%	0,26	1,55	1,81
Insufficient weight	No.	6	4	10
	%	1,55	1,03	2,58
Normal weight	No.	160	40	200
	%	41,34	10,34	51,68
Overweight grade I	No.	50	50	100
	%	12,92	12,92	25,84
Grade II overweight	No.	12	28	40
	%	3,10	7,24	10,34
Total	No.	235	152	387
	%	60,72	39,82	100

The analysis revealed a statistically significant association between BMI and physical fitness (χ^2=78,91; p<0,001). The likelihood ratio (81,23; p<lt; 0,001) confirmed this relationship, indicating that the observed differences are not attributable to chance (table 4).

Table 4. Statistical significance between BMI classification and physical fitness of students			
Statistical significance	Value	gl	Asymptotic significance (two-tailed)
Pearson's chi-square	78,91	5	0,000
Likelihood ratio	81,23	5	0,000
Number of valid cases	387		

DISCUSSION

The findings of this study reveal a worrying profile in the physical fitness of medical science students in Palma Soriano, characterized by a high prevalence of excess weight and a considerable proportion of students who do not reach the recommended levels of physical fitness. These results become even more relevant when compared with international and regional literature, allowing for a deeper understanding of the underlying factors.

The combined prevalence of overweight and obesity identified in the present sample significantly exceeds that reported in similar studies. Research such as that by Guzmán-Muñoz et al.[6] and Elles-Cuadro et al.[7] documents rates of excess weight between 28-35 % in medical schools. This disparity could be explained by specific regional factors, such as particular dietary patterns in the area or characteristics of the built environment that limit opportunities for physical activity. We agree with Lopera et al.[8] that the demanding academic requirements of the medical curriculum are a determining factor, promoting sedentary lifestyles and limiting the time available for regular exercise. This situation is exacerbated by what some authors have called "the health professional paradox," where those trained to promote healthy lifestyles show difficulties in implementing them in their own lives.

The strong association between BMI and physical fitness is consistent with findings in the international scientific literature. Studies such as those by Rangel et al.[9] in Spain and Castañeda et al.[10] in Ecuador have consistently demonstrated how excess body weight compromises cardiorespiratory and muscular capacity. However, the particularly high proportion of unfit individuals in the grade I overweight category exceeds that reported in comparable studies such as that by Ortiz Lozano[11] in Mexico, where this proportion did not exceed 35 %. This discrepancy could suggest the influence of additional factors not measured in our study, such as the quality of physical activity performed or specific aspects of body composition not captured by BMI.

When contextualizing the findings, we find that the overall proportion of students classified as fit is below the international standards recommended for young populations. Authors such as Quirumbay Vera et al.[12] in their study establish that at least 75 % of young university students should maintain adequate levels of physical fitness to ensure optimal health. This gap is especially concerning in the case of future health professionals, who should serve as role models for healthy behaviors.

The concentration of these problems in the middle years (61 % in the 2nd-4th years) coincides with the findings of Aldea et al.[13] in Chile and Ñahui et al.[14] in Peru, who identified this period as critical due to the maximum academic workload. This pattern suggests the need to implement specific interventions targeting these academic levels, possibly by integrating physical activity programs into the academic curriculum.

It is important to recognize the limitations of this study, mainly its cross-sectional design, which prevents the establishment of causal relationships, the restriction to a single institution, which limits generalization, and the lack of evaluation of psychosocial variables such as academic stress or detailed eating habits. Future research should incorporate longitudinal methodologies and expand the analysis to qualitative variables that allow for a better understanding of the determinants of this phenomenon.

CONCLUSIONS

The findings reveal a worrying level of physical unfitness and a high prevalence of excess weight among medical science students, showing a significant association between higher BMI and impaired functional capacity. These results, consistent with the international literature, highlight the paradox between their professional training and their health habits, underscoring the urgent need to implement integrated institutional programs to promote physical activity and healthy eating, particularly during the middle years of their studies when the problem is most concentrated.

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CONFLICT OF INTEREST
The authors declare that there is no conflict of interest.

AUTHOR CONTRIBUTION
Conceptualization: Katia Abón Guerra, Juan Leonardo Pacios Dorado, Christian José Arencibia Pagés.
Data curation: Katia Abón Guerra, Juan Leonardo Pacios Dorado, Christian José Arencibia Pagés, Mayenin Fuentes Tur, Yaimara González Puig, Raiza Fernández Sosa.
Formal analysis: Katia Abón Guerra, Juan Leonardo Pacios Dorado, Christian José Arencibia Pagés.
Research: Katia Abón Guerra, Juan Leonardo Pacios Dorado, Christian José Arencibia Pagés, Mayenin Fuentes Tur, Yaimara González Puig, Raiza Fernández Sosa.
Methodology: Katia Abón Guerra, Juan Leonardo Pacios Dorado, Christian José Arencibia Pagés.
Project management: Katia Abón Guerra, Juan Leonardo Pacios Dorado, Christian José Arencibia Pagés.
Resources: Katia Abón Guerra, Juan Leonardo Pacios Dorado, Christian José Arencibia Pagés, Mayenin Fuentes

Tur, Yaimara González Puig, Raiza Fernández Sosa.
    Software: Katia Abón Guerra, Juan Leonardo Pacios Dorado, Christian José Arencibia Pagés.
    Supervision: Katia Abón Guerra, Juan Leonardo Pacios Dorado, Christian José Arencibia Pagés.
    Validation: Katia Abón Guerra, Juan Leonardo Pacios Dorado, Christian José Arencibia Pagés.
    Visualization: Katia Abón Guerra, Juan Leonardo Pacios Dorado, Christian José Arencibia Pagés.
    Writing – original draft: Katia Abón Guerra, Juan Leonardo Pacios Dorado, Christian José Arencibia Pagés.
    Writing – revision and editing: Katia Abón Guerra, Juan Leonardo Pacios Dorado, Christian José Arencibia Pagés.