

Asociación entre práctica deportiva y resiliencia en universitarios ecuatorianos

Association between sports practice and resilience in Ecuadorian university students

Víctor Fabricio Ortiz-Aldean¹, Nelson Rafael Otañez-Enríquez², Ernesto Fabricio Polo-Luna³, Sylvia Catalina Vega-Illescas⁴, Fausto Xavier Pozo-Oña⁵

¹*Docente, Facultad de Cultura Física, Universidad Central del Ecuador, Quito, Ecuador Correo: vfortiz@uce.edu.ec
<https://orcid.org/0000-0001-8770-0592>

²Docente, Facultad de Cultura Física, Universidad Central del Ecuador, Quito, Ecuador Correo: nrotanez@uce.edu.ec
<https://orcid.org/0000-0003-1561-426X>

³Docente, Facultad de Cultura Física, Universidad Central del Ecuador, Quito, Ecuador Correo: efpolo@uce.edu.ec
ORCID: <https://orcid.org/0009-0002-6277-9112>

⁴Docente, Facultad de Cultura Física, Universidad Central del Ecuador, Quito, Ecuador Correo: scvegai@uce.edu.ec
<https://orcid.org/0000-0001-9832-7244>

⁵Docente, Facultad de Cultura Física, Universidad Central del Ecuador, Quito, Ecuador Correo: fxpozo@uce.edu.ec
ORCID: <https://orcid.org/0000-0003-1276-4801>

*Autor de correspondencia: Víctor Fabricio Ortiz-Aldean, e-mail: vfortiz@uce.edu.ec

Resumen

La transición a la educación superior constituye una etapa crítica caracterizada por múltiples exigencias académicas, sociales y emocionales que pueden afectar la salud mental de los estudiantes (Yapar et al., 2025). En este contexto, la práctica de actividad físico-deportiva ha sido ampliamente reconocida como un factor asociado al bienestar psicológico y al fortalecimiento de la resiliencia (Guo, 2025; Çakir et al., 2025). El presente estudio tuvo como objetivo analizar la asociación entre la práctica físico-deportiva y la resiliencia en estudiantes de la Facultad de Cultura Física de la Universidad Central del Ecuador. Se desarrolló una investigación con enfoque cuantitativo, diseño no experimental y corte transversal, en una muestra de 557 estudiantes (edad media = 22,7 años; 76,5 % hombres). La actividad física se evaluó mediante el **International Physical Activity Questionnaire–Short Form (IPAQ-SF)** y la resiliencia mediante la **Escala Connor-Davidson de 10 ítems (CD-RISC-10)**, que presentó propiedades psicométricas adecuadas ($KMO = .90$; $\alpha = .850$), lo que confirma su validez y fiabilidad en esta población. Los análisis realizados con SPSS y AMOS incluyeron el análisis factorial exploratorio y confirmatorio, la prueba t de Student y la regresión logística binaria. Los resultados evidenciaron que no existen diferencias estadísticamente significativas en los niveles de resiliencia entre estudiantes con práctica físico-deportiva sistemática y aquellos con práctica no sistemática ($t = -0.21$; $p = .83$), y que la resiliencia no constituye un predictor de la práctica sistemática de actividad física. Estos hallazgos contrastan con parte de la evidencia internacional (Román-Mata et al., 2020) y sugieren que la resiliencia responde a un fenómeno multifactorial influido por variables motivacionales, sociales y contextuales (Southwick et al., 2014), lo que respalda la necesidad de implementar estrategias integrales de bienestar universitario que trasciendan la promoción exclusiva de la actividad física.

Abstract

The transition to higher education is a critical stage characterized by multiple academic, social, and emotional demands that can affect students' mental health (Yapar et al., 2025). In this context, physical activity and sports have been widely recognized as a factor associated with psychological well-being and the strengthening of resilience (Guo, 2025; Çakir et al., 2025). This study aimed to analyze the association between physical activity and sports and resilience in students of the Faculty of Physical Culture at the Central University of Ecuador. A quantitative, non-experimental, cross-sectional study was conducted with a sample of 557 students (mean age = 22.7 years; 76.5% male). Physical activity was assessed using the **International Physical Activity Questionnaire–Short Form (IPAQ-SF)**, and resilience was assessed using the **10-item Connor-Davidson Resilience Scale (CD-RISC-10)**, which demonstrated adequate psychometric properties ($KMO = .90$; $\alpha = .850$), confirming its validity and reliability in this population. Analyses performed with SPSS and AMOS included exploratory and confirmatory factor analysis, Student's t -test, and binary logistic regression. The results showed no statistically significant differences in resilience levels between students with systematic physical activity and those with non-systematic activity ($t = -0.21$; $p = .83$), and that resilience is not a predictor of systematic physical activity. These findings contrast with some of the international evidence (Román-Mata et al., 2020) and suggest that resilience is a multifactorial phenomenon influenced by motivational, social and contextual variables (Southwick et al., 2014), which supports the need to implement comprehensive university well-being strategies that go beyond the exclusive promotion of physical activity.

*Author for Correspondence: drjinalthakkar25@gmail.com

Keywords: Resilience; Physical and sports activity; Psychological well-being; University students; Socio-emotional competencies

How to cite this article: Ortiz-Aldean VF, Otañez-Enríquez NR, Polo-Luna EF, Vega-Illescas SC, Pozo-Oña FX.

Asociación entre práctica deportiva y resiliencia en universitarios ecuatorianos / Association between sports practice and resilience in Ecuadorian university students. *Int J Drug Deliv Technol.* 2026;16(71s): 20-27. DOI: 10.25258/ijddt.16.71s.3

1. Introduction

The university era is a crucial time for young people who are beginning to become adults, a stage full of great changes in their way of thinking, feeling and relating to the environment (Yapar et al., 2025). During this time, the lives of young people are altered in a disruptive way, with pressures related to academic overload, adapting to a new environment, uncertainty of not knowing what will happen in their future work and the accelerated use of technology; pressures that tend to seriously compromise your emotional health (Nina & Pérez, 2023; Zhang, 2025). During this time, the lives of young people are altered in a disruptive way, with pressures related to academic overload, adapting to a new environment, uncertainty of not knowing what will happen in their future work and the accelerated use of technology; pressures that tend to seriously compromise their emotional health (Martín-Rodríguez & González-Prieto, 2026; Yang et al., 2025). Faced with this reality, the practice of AF has become a great ally, a highly effective natural non-pharmacological alternative to counteract negative emotional states (Guo, 2025). Previous studies related to the practice of PA indicate that it favours not only cardiovascular health but also self-concept and personal responsibility (Nina & Pérez, 2023). Despite the overwhelming benefits that these studies point out in universities, PA is rarely practised regularly (Román-Mata et al., 2020).

As it stands, scientific evidence supports an inverse and consistent association between regular exercise and perceived stress levels (Çakir et al., 2025; Liu et al., 2024). However, recent research has begun to delve into psychological resilience as a key attribute that allows individuals to regain their dynamic balance in the face of adversity, allowing the individual to achieve a sense of self-sufficiency (Southwick et al., 2014). Resilience is defined not as a static trait, but as a dynamic process influenced by personal and biological factors that can be enhanced by an active posture (Rutter, 2001). Various cross-sectional studies and meta-analyses indicate that physically active students have higher levels of personal strength, optimism and social competence compared to their sedentary peers (Jerez, 2021; Román-Mata et al., 2020; Xu et al., 2021). From a molecular perspective, exercise stimulates the secretion of neurotrophic factors and modulates the hypothalamic-pituitary-adrenal axis, essential processes for neuroplasticity and stress tolerance (Yang et al., 2025).

Despite this consensus, there is still a significant gap in understanding the underlying psychological mechanisms linking PA to resilience in the university population (Xu et al., 2021). Most analyses have been

limited to examining direct effects, omitting the mediating role that sports practice has with emotional recovery in the face of adversity (Garrido-Muñoz et al., 2024). In addition, there are discrepancies on how exercise intensity differentially influences resilience and whether these relationships are moderated by gender or social support (Dunston et al., 2022). Therefore, an integrative synthesis is required to clarify these psychological paths in diverse contexts, from medical schools to rural environments (Nina & Pérez, 2023). In this context, it is necessary to deepen the understanding of physical activity and psychological resilience in the university population, considering that both constructs play a relevant role in the promotion of well-being and the prevention of mental health problems. Despite the existing evidence on its individual benefits, questions remain regarding the magnitude and nature of its association in higher education students. Therefore, the objective of this research is to analyse the association between physical-sports practice and resilience in university students, providing evidence that supports the implementation of well-being strategies and comprehensive training in higher education.

2. Materials and methods

2.1 Study design

Methodologically, the research was structured under a quantitative, non-experimental and cross-sectional approach, whose level was descriptive and correlational-associative as it was aimed at characterising the levels of resilience and describing the prevalence of the practice of physical-sports activity to subsequently determine the existence of significant differences and associations between both constructs in the population studied.

2.2. Participants

The study was carried out with students from the Faculty of Physical Culture of the Central University of Ecuador, located in Quito, capital of the province of Pichincha. The sample consisted of 557 students, with a mean age of 22.7 years ($SD = 3.33$), of which 76.5% were men. The participants belonged to semesters 1 to 8 and all completed the questionnaires and signed the informed consent, complying with the ethical requirements established by the Ethics Commission of the University of Alicante (File UA-2025-10-21).

2.3 Instruments

- **Practice of physical-sports activity:** It was assessed using the short version of the *International Physical Activity Questionnaire* (IPAQ-SF) (Craig et al., 2003). The questionnaire records the frequency (days per week)

and duration (minutes per day) of vigorous, moderate-intensity, and walking physical activities performed during the previous seven days. For statistical analyses, the moderate and high levels were grouped into the category of *systematic practice*, while the low level was classified as *non-systematic practice*, based on the recommendations of the World Health Organization (WHO, 2020).

- **Resilience Questionnaire:** The abbreviated version of the *Connor-Davidson Resilience Scale* (CD-RISC), composed of 10 items, validated in the Spanish population (Notario-Pacheco et al., 2011) was used. It has a one-dimensional Likert-type structure (0 = never; 4 = almost always) with a total score range of 0 to 40.

2.4. Procedure

Meetings were held with the authorities of the Faculty (Dean and Sub-Dean) to obtain the corresponding permits. The application of the instruments was carried out in each parallel per semester in person and anonymously with the support of the teachers. The general instructions were explained, and the data were

subsequently coded and processed using SPSS 2.6 software.

2.5. Statistical analysis

Descriptive analyses (means and standard deviations) were performed. The factor structure of the CD-RISC-10 scale was evaluated by Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) using SPSS 22 and AMOS 20. Internal consistency was estimated using Cronbach's alpha coefficient. To compare resilience scores between students with systematic and non-systematic practice, Student's t-test was used for independent samples. Finally, a binary logistic regression was applied to determine the predictive capacity of resilience on the systematic practice of physical exercise, considering a significance level of $p < .05$.

3. Results

3.1. Sample Characterisation

The socioeconomic distribution and physical sports activity of the 557 students evaluated is detailed in Table 1.

Table 1 Sociodemographic characteristics and distribution of the practice of physical-sports activity among university students ($n = 557$)

Variable	Category	n	%
Age (years)	22.7 ± 3.33	—	—
Sex	Male	426	76.5
	Female	131	23.5
Activity practice physical-sports	Systematic practice	371	66.6
	Non-systematic practice	186	33.4
Total		557	100.0

Note. The practice of physical-sports activity was classified using the International Physical Activity Questionnaire–Short Form (IPAQ-SF).

3.2. Análisis Factorial Exploratorio (AFE)

The EFA showed adequate data adequacy [KMO index = .90; significant Bartlett sphericity test, $\chi^2(45) = 1772.45$; $p < .001$]. The solution obtained revealed a unifactorial structure that explained 36.96% of the total variance, with factor loads for the 10 items ranging from .401 to .692 (see Table 2). Kaiser's criterion ($\lambda > 1$) confirmed the retention of a single major factor (see Sedimentation Graph in Figure 1).

Table 2 Factor loads of the items of the CD-RISC-10 resilience scale

Item	Carga Factorial
RE1	.614
RE2	.666
RE3	.632
RE4	.683
RE5	.570
RE6	.541
RE7	.627
RE8	.401
RE9	.692
RE10	.600

Note. The factor loads correspond to the unifactorial solution obtained by exploratory factor analysis. Values of $\lambda \geq .401$ indicate an adequate contribution of the items to the latent resilience factor.

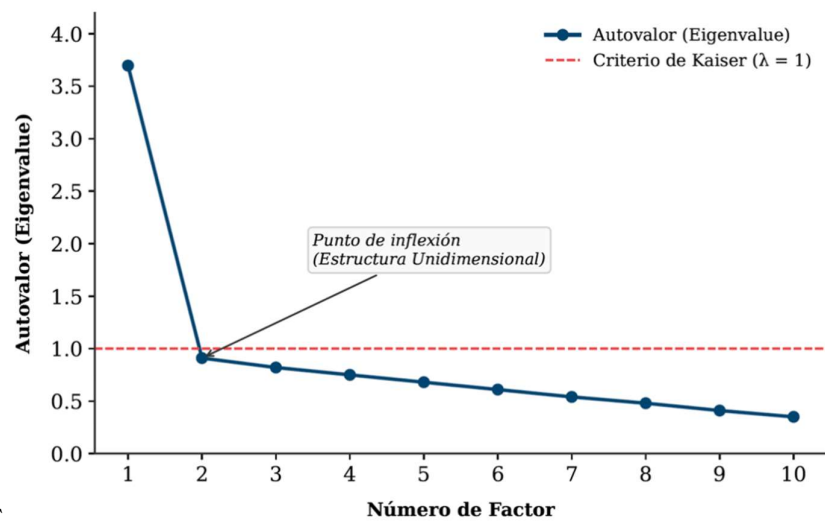


Figura1 Resilience Scale Scree Plot

The sedimentation figure presents the eigenvalues obtained in the exploratory factor analysis of the 10 items of the Resilience Scale. A pronounced decrease is observed between the first and second factors, followed by a stabilisation of the eigenvalues. According to Kaiser's criterion ($\lambda > 1$), only the first factor exceeds the retention threshold, supporting a one-dimensional structure of the scale.

3.3. Confirmatory Factor Analysis (CFA)

Although the Chi-square statistic was significant due to the sensitivity of the sample size [$\chi^2(34)=111.697$; $p=.000$], the remaining indices evaluated indicated an optimal fit of the unifactorial model (see Table 3 and the structure modelled in Figure 2)

Tabla 3 Resilience Scale Statistical Model Goodness of Fit Index

Model	χ^2	g.l.	p	$\chi^2/\text{g.l.}$	RMSEA	GFI	AGFI	NFI	TLI	CFI	AIC
Own model	111.697	34	.000	3.285	.070	.95	.93	.92	.927	.945	153.697

Note: χ^2 = Chi-square. g.l. = Degrees of freedom. p = Probability. RMSEA= Approximation error of the square means. GFI= Goodness of Fit Index. AGFI = Adjusted goodness of fit indices. NFI=Normative adjustment index. TLI= Tucker–Lewis index. CFI = Comparative Adjustment Index. AIC: Akaike Information Criteria.

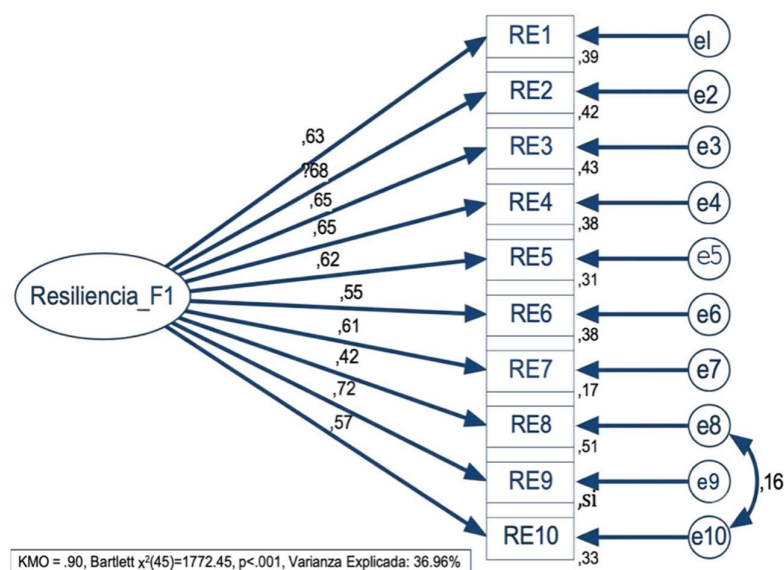


Figure 2. Factor structure of the Resilience Scale obtained through exploratory factor analysis.

The diagram presents the unifactorial solution of the Resilience Scale, with the standardized factor loads of the 10 items and their associated errors. The model showed adequate sampling adequacy ($KMO = .90$), a significant Bartlett sphericity test ($\chi^2(45) = 1772.45, p < .001$) and an explained variance of 36.96%.

The reliability of the scale through Cronbach's alpha was .850 with a score of $M = 31.78$ and $SD = 5.64$, the mean in the items ranged from 2.71 (item RE8) to 3.39 (item RE6). The correlations between the items and the total score on the scale ranged from .536 to .720, and among the items the lowest was .183 between the RE3 and the RE8 items, while the highest was .514. RE1 and RE2 (see Table 4).

3.4. Reliability and Descriptive Analysis of Items

Tabla 4 Reliability, Means, Standard Deviation and Correlation Between Items

	M	DE	RE1	RE2	RE3	RE4	RE5	RE6	RE7	RE8	RE9	RE10
RE1	3.22	.80	1									
RE2	2.90	.81	.514**	1								
RE3	3.36	.80	.433**	.436**	1							
RE4	2.93	.91	.402**	.453**	.465**	1						
RE5	3.07	.85	.380**	.385**	.368**	.379**	1					
RE6	3.39	.69	.362**	.360**	.351**	.263**	.384**	1				
RE7	2.96	.87	.325**	.386**	.348**	.472**	.342**	.411**	1			
RE8	2.71	1.10	.184**	.231**	.183**	.247**	.272**	.216**	.293**	1		
RE9	3.24	.82	.388**	.418**	.415**	.452**	.369**	.393**	.460**	.328**	1	
RE10	2.99	.96	.316**	.381**	.386**	.496**	.262**	.239**	.369**	.304**	.493**	1
Total	31.78	5.64	.644**	.689**	.660**	.716**	.629**	.583**	.675**	.536**	.720**	.666**
T-C			.549	.600	.567	.620	.523	.493	.576	.374	.637	.553
a-i			.829	.825	.828	.822	.832	.835	.827	.851	.821	.829

Note. T-C = Corrected total item-correlation; α -i = Cronbach's alpha if the item is deleted. All inter-item correlations were significant at the p-level $< .01$

3.5. Comparative and Predictive Analytics

Student's t-test for independent samples revealed that there are no statistically significant differences in resilience between the non-systematic practice group ($M = 30.71$) and the systematic practice group ($M = 30.83$) [$t = -0.21$, $p = .83$] (see Table 5 and Figure 3). Accordingly, the binary logistic regression model demonstrated that resilience is not a statistical predictor with the capacity to predict the systematic practice of physical exercise in the population analysed.

Table 5 Mean Difference and Statistical Significance in Resilience as a Function of Physical Exercise Practices

Dimensions	Levene test		Non-systematic practice		Systematic practice		Significance Statistics		
	F	p	M	SD	M	SD	t	g.l.	p
Resilience	.01	.905	30.71	5.62	30.83	5.73	-.21	.554	.83

Note. M = Mean; SD = Standard deviation; t = Student's t-statistic; $g.l.$ = Degrees of freedom; p = Value of statistical significance. The values of the Levene Test ($F = .01$; $p = .905$) indicate homogeneity of variances, fulfilling the assumption for the interpretation of the t-statistic. No statistically significant differences were found in resilience between the two groups ($p > .05$).

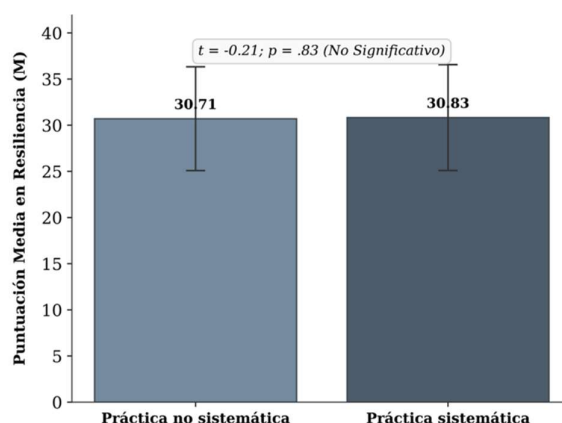


Figure 3 Comparison of average resilience scores according to physical activity practice.

With the Resilience scores, no logistic regression model was created to predict the practice of physical exercise; therefore, this variable was not a predictor of the systematic practice of physical exercise in the university students investigated.

4. Discussion

The findings of this study suggest that resilience is not necessarily a driver that drives college students to exercise more, and that there are also no clear differences in their resilience based on how often they train ($t = -0.21$; $p = .83$). These results contrast with a solid line of previous research that suggests that exercise and resilience go hand in hand. Traditionally, it has been argued that practising regular physical activity helps our bodies respond much better to stress. On a biological level, exercise works as a natural regulator of emotions because it balances key hormones and stimulates the production of protective proteins in the brain. Under the framework of the Theory of Conservation of Resources (COR), sport is understood as a personal investment that generates a "spiral of well-being", where tools such as mindfulness and self-efficacy make us stronger in the face of adversity.

This lack of differences in our results forces us to take a closer look at the context of the study. A first explanation is in the profile of the participants: they all belong to the Faculty of Physical Culture. For them, movement is part of their daily routine and academic

obligations. The literature points out that when exercise becomes an external pressure or a curricular burden, it can lose some of its magic in relieving psychological stress due to performance burnout. Because they are so accustomed to the physical effort of their running, the sample becomes very homogeneous, which prevents the frequency of exercise alone from making a difference in their emotional strength. Under the framework of resource conservation theory, PA is a proactive investment that generates a "profit spiral", where increased mindfulness and self-efficacy sequentially strengthen resilience (Guo, 2025; Siddiquei et al., 2025). This strengthening is particularly robust when vigorous intensity levels are reached, which are positively associated with determination and perseverance (Dunston et al., 2022; Qiu et al., 2025).

As they are exclusively students of Physical Culture, it is highly likely that PA – both systematic and non-systematic – is an intrinsic part of their daily life, academic demands and mandatory lifestyles. In this sense, authors such as Garrido-Muñoz et al. (2024) suggest that when physical exercise is associated with external pressure, technical evaluation or curricular load, their buffering mechanisms of psychological stress can be attenuated or neutralised by the exhaustion associated with academic performance. Therefore, habituation to high levels of physical movement in this specific population homogenises the sample, preventing the

"frequency" of the practice alone from discriminating levels of psychological strength.

In addition, today we know that training and being resilient are not a simple matter of adding hours in the gym. Science invites us to look beyond frequency and focus on why we move and how it makes us feel. According to the Theory of Self-Determination, the emotional benefits are multiplied when we exercise for the pleasure of doing so, to free the mind or have a good time. On the other hand, if exercise becomes just another obligation – either due to academic pressures or because of the obsession with the scale and physical appearance – it loses much of its magic, and its positive impact on our mental health decreases considerably (Ryan & Deci, 2017). Dunston et al. (2022) postulate that vigorous intensity and the type of discipline (combat sports or high mental demand) are the true dynamizers of determination (*grit*) and coping, qualitative variables that need to be controlled in future designs.

On the other hand, resilience is an eminently multifactorial and dynamic construct, sensitive to macro-variables of the socio-educational environment. It is plausible that the transversal stressors of current university life, such as job uncertainty in the Ecuadorian context, socioeconomic pressures and technological overload, configure an allostatic load so high that it exceeds the protective benefits of isolated physical exercise. As he rightly points out, Southwick et al. (2014), the ability to adapt in the face of adversity emerges from a complex matrix that articulates social support networks, cognitive coping strategies and macro-contextual stability. The fact that walking or low-impact practices sometimes act as predictors of well-being reinforces the notion that it is not the rigid or systematic structure of the training that builds resilience, but the psychological meaning, mental disconnection, and social support that the student experiences during the activity.

5. Conclusion

The Resilience Scale (CD-RISC-10) presents adequate psychometric properties in students of the Faculty of Physical Culture of the Central University of Ecuador. The findings confirm a consistent one-dimensional structure and satisfactory levels of reliability for its context, demonstrating that the instrument is a valid and methodologically robust tool for assessing coping ability in this population.

The results of the study indicate that there are no statistically significant differences in the levels of resilience between students who perform systematic physical-sports practice and those who perform it non-systematically, which suggests that, in this sample, the frequency of sports practice is not associated with higher levels of resilience.

The results obtained invite us to reflect on the need to design comprehensive strategies that are not limited only to physical-sports practice, but that incorporate training, recreational and socio-educational activities aimed at strengthening socio-emotional competencies in university students. Resilience, being a multifactorial construct, requires a holistic approach that considers

both internal and external factors, including the social and academic context.

Likewise, the importance of developing longitudinal studies that allow analysing the interaction between resilience and different types of physical activity is raised, considering psychological, motivational and contextual variables that explain the variability in the results.

This approach will contribute to generating solid evidence for the implementation of university wellness programs that promote healthy lifestyles and the integral development of the student.

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