Physical Activity Levels in Various University Majors Amidst the COVID-19 Pandemic: A Comparative Study

Nivel de actividad física en varias carreras universitarias en medio de la pandemia de COVID-19: Un estudio comparativo

Níveis de atividade física em várias carreiras universitárias em meio à pandemia de COVID-19: Um estudo comparativo

Iván Molina-Márquez[1] & Andrés Rodríguez-Morales[2]

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ABSTRACT

This study determined levels of physical activity in students by comparing them based on gender, faculty, and major among university students during the Covid-19 pandemic. The research followed a quantitative approach with a descriptive-comparative design. The study was conducted once per student, with the participation of 582 students of both genders. The International Physical Activity Questionnaire (IPAQ) was administered to the students using Google Forms, distributed through their institutional emails. The collected data were analyzed using the statistical software SPSS V.22.0. The independent samples t-test was employed to compare the energy expenditure between males and females, along with Cohen's d statistic to assess the effect size. Prior to these analyses, the Kolmogorov-Smirnov normality test and Levene's test were conducted. Results were considered significant when the p-value was <0.05. The findings indicate that males allocate more time to work than females. Additionally, it was observed that males exhibit a higher level of physical activity than females within the engineering field. Lastly, majors with the highest levels of physical activity per week were Physical Education and Nutrition. These outcomes shed light on the reality of physical activity levels among Chilean university students based on faculty and major. University authorities should consider promoting physical activity programs, particularly emphasizing women and majors such as engineering, architecture, and mathematics, which have shown lower levels of physical activity.

Key words: Physical activity; COVID-19; University students; Pandemic.

[1] Magíster Ciencias Biológicas, Magíster Ciencias del Ejercicio, Grupo Afsye, pedagogía en Educación Física, Universidad Adventista de Chile, Chillán, Chile. https://orcid.org/0000-0001-6003-5107 | ivanmolina@unach.cl

[2] Doctor en Ciencias Biológicas, Machine Learning Aplicado en Biomedicina (MLAB), Departamento de Ciencias Básicas, Universidad del Bío-Bío, Chillán, Chile. https://orcid.org/0000-0003-0101-8328 | arodriguez@ubiobio.cl

RESUMEN

Este estudio determinó los niveles de actividad física en estudiantes comparando por sexo, facultad y carrera en estudiantes universitarios en tiempos de pandemia por de Covid-19. Este estudio tiene un enfoque de investigación cuantitativa con diseño descriptivo-comparativo. Este estudio se aplicó una sola vez por estudiante contando con la participación de 582 estudiantes de ambos sexos. A los estudiantes se les aplicó el cuestionario Internacional de Actividad Física (IPAQ) mediante Google forms haciéndoselos llegar sus correos institucionales. Los datos obtenidos se analizaron en el programa estadístico SPSS V.22.0. Se utilizo la prueba estadística T-student para muestras independientes para comparar el coste energético entre hombres y mujeres, además del estadístico d de Cohen para evaluar el tamaño del efecto. Antes de realizar estas evaluaciones se realizó la prueba de normalidad Kolmogorov Smirnov y prueba de Levene. Se consideraron resultados significativos cuando el valor de p fue <0.05. Los resultados indican que los hombres destinan mayor tiempo a trabajar que las mujeres, además se encontró que los hombres poseen mayor nivel de actividad física que las mujeres en ingeniería. Finalmente, los estudiantes de las carreras con mayor nivel de actividad física a la semana fueron Educación física y nutrición. Estos resultados dan cuenta de la realidad en universitarios chilenos respecto al nivel de actividad física por facultad y por carrera. Las autoridades universitarias deberían promover programas de actividad física enfatizando en mujeres y en carreras de ingeniería, arquitectura y matemática que han mostrado menores niveles de actividad física.

Palabras clave: Actividad física; COVID-19; Universitarios; Pandemia.

RESUMO

Este estudo determinou os níveis de atividade física em estudantes, comparando por gênero, faculdade e curso entre estudantes universitários durante a pandemia de Covid-19. A pesquisa seguiu uma abordagem quantitativa com um design descritivo-comparativo. O estudo foi conduzido uma única vez por estudante, com a participação de 582 estudantes de ambos os gêneros. O Questionário Internacional de Atividade Física (IPAQ) foi administrado aos estudantes por meio do Google Forms, distribuído por meio de seus e-mails institucionais. Os dados coletados foram analisados usando o software estatístico SPSS V.22.0. O teste t de amostras independentes foi empregado para comparar o gasto energético entre homens e mulheres, juntamente com a estatística d de Cohen para avaliar o tamanho do efeito. Antes dessas análises, o teste de normalidade de Kolmogorov-Smirnov e o teste de Levene foram conduzidos. Resultados foram considerados significantes quando o valor de p foi <0.05.

Os resultados indicam que os homens dedicam mais tempo ao trabalho do que as mulheres. Adicionalmente, observou-se que os homens apresentam um nível mais elevado de atividade física do que as mulheres no campo da engenharia. Por fim, os cursos com os níveis mais altos de atividade física por semana foram Educação Física e Nutrição. Estes resultados lançam luz sobre a realidade dos níveis de atividade física entre estudantes universitários chilenos com base na faculdade e no curso. As autoridades universitárias devem considerar a promoção de programas de atividade física, especialmente enfatizando as mulheres e os cursos como engenharia, arquitetura e matemática, que mostraram níveis mais baixos de atividade física.

Palavras chave: Atividade física; COVID-19; Estudantes universitários; Pandemia.

INTRODUCTION

In recent years, there has been a notable shift in global population lifestyle, with an alarming increase in sedentary and unhealthy behaviors (Cristi-Montero et al., 2015). Unfortunately these changes have significantly contributed to a higher prevalence of key risk factors for chronic noncommunicable diseases (NCDs) (Rosa-Guillamón, 2019), resulting in a decline in the overall quality of life for people worldwide (Rodríguez et al., 2013). The World Health Organization [WHO] has estimates that inadequate levels of physical activity (PA) and the

escalating obesity rates are responsible for more than 1.9 and 2.6 million deaths worldwide, respectively (Guamialamá-Martínez & Salazar-Duque, 2018). These alarming statistics highlight the urgent need to address the global health crisis caused by sedentary lifestyles (Hall-López & Ochoa-Martínez, 2020).

In the context of PA, urbanization phenomenon, increased accessibility to technology and the constraints of modern schedules have emerged as primary contributors to the pervasive decline in PA levels worldwide. Alarmingly, one out of every four adults across the globe currently falls short of meeting recommended PA standards. In fact, a staggering 60% of the world's population fails to engage in the requisite PA essential for achieving health benefits (Celis-Morales et al., 2018; Díaz et al., 2015). Turning our attention to Chile, data gleaned from the National Health Survey conducted during 2009-2010 (EANS 2009-2010), reveals a disconcerting static: a substantial 27.1% of the Chilean population grapples with physically inactive (Celis-Morales et al., 2018), This reality is profoundly troubling, as projection suggest that mitigating physical inactivity could potentially curtail premature deaths by a significant margin, estimated between 0.5 and 1.3 million annually (Morales et al., 2017).

The severe acute respiratory syndrome coronavirus 2 (sars-cov-2) inflicted a toll of over 6,000,000 deaths, inducing a substantial downturn in levels of pa and a concur-rent surge in sedentary behaviors, driven by the confinement measures enacted for public health purposes. the highly contagious nature of the disease mandated these preventive actions (Celis-Morales et al., 2020; Hall-López & Ochoa-Martínez, 2020). across the globe, individuals have encountered formidable barriers to maintaining a healthy level of physical activity during these challenging times. in certain regions, reports have indicated a staggering 50% reduction in physical activity a disconcerting trend resulting from an amalgamation of factors. one significant contributor is the scarcity of accessible and secure outdoor communal spaces, such as parks, that have traditionally facilitated physical activity opportunities. this inequitable availability has exacerbated the predicament (Park et al., 2022)

Sedentary behavior, as elucidated by Solís-Urra (2016), encompasses the absence of movement during one's waking hours, spanning the entire day. Such behavior is typified by engagements that marginally surpass the basal energy expenditure threshold, approximating 1 metabolic equivalent of task (MET), with a MET being the equivalent of an oxygen consumption rate of 3.5 $ml.kg.min^{-1}$ (Rodríguez et al., 2013). This construct finds its place as the introductory tier within the continuum of PA classifications, categorized by intensity levels: 1) sedentary-type activities (1 to 1.5 MET); 2) light PA (1.5 to 2.9 MET); 3) moderate PA (3 to 5.9 MET); and 4) vigorous PA (≥ 6 MET) (Morales et al., 2017). Moreover, physical inactivity, a counterpart to sedentary behavior, is delineated by the failure to meet the minimal international PA benchmarks for fostering public health: either accruing at least 150 minutes of moderate or vigorous intensity PA per week or achieving energy expenditure equivalent to or exceeding 600 MET/min/week. Individuals falling below these guidelines are deemed physically inactive, in accordance with Yang (2019). The university demographic occupies a pivotal transitional phase, marked by maturation, burgeoning responsibilities, and evolving lifestyle habits, as highlighted by Barrera-Herrera & Vinet (2017). For many university students, this period coincides with the concluding stage of adolescence, colloquially referred to as late adolescence, spanning from ages 19 to 24 (Gaete, 2015). During this juncture, behaviors solidify, often persisting into adulthood, amplifying the

urgency of fostering wholesome habits. This becomes a pivotal linchpin in mitigating the surge of noncommunicable diseases (NCDs) like diabetes, hypertension, and heart ailments (Tohi et al., 2022). Regrettably, this demographic frequently finds itself diverging from healthy dietary practices and sidestepping the minimal PA recommendations (Sánchez et al., 2019; Smith et al., 2014).

In the present landscape, there exists a body of research that has delved into assessing the extent of PA among Chilean university students, as evidenced by studies such as the one conducted by Rodríguez-Rodríguez et al. (2018). Moreover, investigations have extended to other corners of the globe, painting a diverse picture of PA behaviors amidst the pandemic. Countries like Hungary, Italy, the United States, and Croatia, as documented by López-Valenciano et al. (2021), have documented the fluctuations in PA levels among university students during the COVID-19 pandemic. These examinations unveiled intriguing insights—such as the absence of discernible gender disparities in PA engagement and the resilience of students under 22 years of age, who largely remained physically active during the pandemic's upheaval. Nonetheless, it is crucial to recognize that these findings may not be directly transferable to the Chilean context. Significantly, there has been a lack of research within the Chilean sphere that mirrors the scope of examining PA behaviors among university students during a pandemic. This void highlights a unique opportunity for further investigation. Thus, the primary aim of this study is to fill this void and discern the nuances of PA levels and energy expenditure within the specific setting of Chilean university students during the unprecedented times of a pandemic. By unraveling the intricacies of PA engagement within this distinctive context, this study aims to contribute valuable insights that can inform targeted interventions and strategies to optimize the well-being of university students amid global challenges.

METHODS

This is a non-experimental, cross-sectional, descriptive and correlational study.

PARTICIPANTS

The study encompassed a universe of 582 university students, spanning ages 21 to 24, and representing both genders (280 women and 302 men), actively engaged in the survey. Inclusion criteria mandated enrollment in professional programs within the faculties of a) Architecture, Construction, and Design, b) Sciences, c) Health and Food Sciences, d) Business Sciences, e) Education and Humanities, or f) Engineering. As an additional prerequisite for participation, prospective respondents were required to have formally endorsed the informed consent protocol, in alignment with the ethical guidelines enshrined in the Helsinki Declaration of the World Medical Association (WMA) (Estrella et al., 2014).

INSTRUMENT AND VARIABLES

The instrument applied was the validated short version of the International Physical Activity Questionnaire (IPAQ) tailored for Chilean contexts, as verified by Serón et al. (2010). This tool's credibility and consistency have been rigorously scrutinized, substantiating its applicability across diverse languages and global settings. The World Health Organization (WHO) has even endorsed the IPAQ for epidemiological surveillance at a population level, tested across 24 countries and actively utilized within multiple regional networks.

The abbreviated IPAQ questionnaire determine the PA level through seven questions that inquire about the time spent in PA

engagement over the preceding week among varying intensities. The instrument segments activities into three distinct types: walking, moderate-intensity activities and vigorous-intensity activities. Duration, frequency within the past seven days, and even the time devoted to walking and sitting are encompassed. The calculation to determine PA levels was performed as follows: a) minutes of moderate, vigorous, sitting and walking PA, b) sum of time for walking and moderate PA, and c) sum of walking, moderate and vigorous PA. This classification consequently ascribes students into three tiers—'low,' 'medium,' and 'high'—underpinned by energy expenditure benchmarks of 8, 4, and 3.3 METs, respectively, for vigorous PA, moderate PA, and walking. Energy expenditure was classified in MET/minute/week, which was the result of activities performed at work, as a means of transportation, housework and during leisure time. With this, the total PA energy expenditure per week was calculated.

PROCEDURE

The questionnaire was administered online and was available from June to December 2021 on the university intranet platform to which all students have access. This digital interface was readily accessible to all enrolled students via the university intranet, ensuring widespread availability. The questionnaire was meticulously designed, conveying its intended purpose, and underscoring the voluntary nature of participation.

The participating pool was drawn from a diverse array of academic pursuits, representing a spectrum of disciplines. Notably, respondents hailed from programs such as Nutrition, Physical Education, Architecture, Construction Engineering, Design, Mathematics Pedagogy, Spanish Language Pedagogy, English Pedagogy, Food Engineering, Chemical Engineering, and Civil Engineering. This strategic selection amplified the study's inclusivity and relevance, enabling a comprehensive exploration of physical activity dynamics across a range of academic disciplines.

STATISTICAL ANALYSIS

Data analysis was performed with SPSS statistical software (V. 22.0). The assumption of normality was tested for the total sample and by sex in the variables measured in IPAQ and in the academic variables. A descriptive analysis of the student data according to faculty and PA level of IPAQ was carried out using frequencies and percentages. Statistical test independent samples T-test was used to determine the differences between men and women with respect to energy cost and sedentary time, and to establish possible differences in PA level and weekly energy cost according to faculty and career. In addition, it was used the Cohen d statistical test was used to evaluate the effect size. The normality of the data was evaluated by using Kolmogorov Smirnov, the homoscedasticity of variances was first verified with Levene's test. A significance level of $p<0.05$ was chosen.

RESULTS

Tabulated within the following Table I is the comprehensive delineation of energy cost and work categorization. It is noteworthy that the students under examination share similar age profiles. While this demographic homogeneity is established, gender emerges as a pivotal determinant in energy expenditure patterns. Specifically, among men, there is a discernible elevation in energy outlay concerning transportation-related activities, a phenomenon paralleled in the aggregate measurement of total physical activity (PA). Contrariwise, women exhibit elevated energy costs attributed to leisure engagements, complemented by an extended

duration of sedentary behavior—defined by prolonged periods of sitting. These gender-distinct energy dynamics unveil the intricate interplay between physical activity, gender, and diverse facets of daily life.

Table I

Characterization of the energy cost between men and women.

Variables	Total		Man		Woman		p-value *	d Cohen	Effect size
	Mean	SD	Mean	SD	Mean	SD			
Work (minutes)	5713	7492,7	7800,7	9311,5	3221,2	3089,1	0,007*	0,88	high
Transportation (minutes)	1681,7	2110	1869,1	2344,2	1454,9	1769,5	0,113	0,25	low
Household (minutes)	1567,9	1998,4	1553,7	1800,8	1583,5	2208,2	0,928	0,35	low
Free time (minutes)	3427,6	8527,7	3275,2	3230,4	3592,5	11864,4	0,779	0,43	low
Sitting (minutes)	380,5	203,5	353,8	187,3	413,7	219,2	0,098	0,28	low
Total PA (METs* min/week)	4514	7950,5	4998,3	6328	3965,2	9448	0,204	0,25	low

*: Differences between men and women. Statical test: The independent samples t-test

The characterization between students' faculty affiliations and their corresponding physical activity (PA) levels, delineated by gender, is presented in Table II. The student composition exhibits the highest percentage in Engineering students, encompassing a 26.3% of the sampled participants. This prevalence is mirrored among male students, accounting for a significant 38.4%. In juxtaposition, the Faculty of Sciences occupies the opposite spectrum with the lowest representation, constituting a mere 3.4% of the cohort. This distribution is echoed in gender demographics, where women and men from the same faculty claim percentages of 3.9% and 3.4%, respectively. Among PA levels, the sample is evenly distributed among the three IPAQ levels. An interesting observation surfaces: irrespective of gender, the distribution remains remarkably homogeneous, signifying the absence of significant disparities across categories.

Table II

Percentage of students by faculty and percentage by PA level for the total sample and separated by sex.

Variables Faculty (%)	Total n = 582	Man n = 302	Woman n = 280	p-value*	d Cohen	Effect size
Health and food sciences	15,6%	5%	27,1%		0,22	low
Business sciences	19,8%	25,1%	13,9%		0,15	low
Engineering	26,3%	38,4%	22,4%	0,001*	0,68	half
Architecture, construction and design	14,2%	13,3%	13,2%		0,32	low
Science	3,4%	3%	3,9%		0,18	low
Education and humanities	21,7%	15,2%	28,6%		0,37	low
IPAQ						
Low	33,8%	31,5%	36,4%		0,32	low
Medium	34,2%	31,5%	37,1%	0,0022*	0,58	half
High	32%	37,1%	26,4%	0,0025*	0,75	half

*Differences between men and women. Statical test: The independent samples t-test

Table III shows the amount of PA, quantified in minutes, across different university careers. Notablye, Nutrition and Physical Education careers show the highest PA level, in comparison with Architecture, Construction Engineering, Design, Mathematics Pedagogy, Spanish Language Pedagogy, English Pedagogy, Food Engineering, Chemical Engineering and Civil Engineering careers which exhibits relatively lower PA levels. Physical Education and Nutrition students, which perform the most PA per week, are classified in vigorous and moderate levels correspondingly.

Table III

Level of physical activity among university careers.

Careers	Number of students	PA minutes per week	Leve lof PA
Nutrition	60	284±40	Media
Physical Education	143	315±35	High
Architecture	43	74±6	Low
Construction Engineering	32	56±4	Low
Design	41	48±4	Low
Pedagogy in mathematics	53	53±10	Low
Pedagogy in Spanish language	38	87±15	Low
Pedagogy in English	53	89±5	Low
Food Engineering	40	63±8	Low
Chemical Engineering	43	72±10	Low
Civil Engineering	36	64±29	Low

DISCUSSION

This research aims to determine the PA levels and energy cost of Chilean university students during the challenging panorama of a pandemic global condition.

Pertinent findings have brought to light a consistent trend where male participants exhibit higher levels of PA than their female counterparts. These results resonate with antecedent studies conducted in Chile's Valparaíso region among university students (Farinola & Bazán, 2010; Rubio & Varela, 2016). Comparable observations arise from across diverse regions. For instance, a study conducted in the Araucanía region's Temuco city highlighted that a substantial 70.6% of higher education students identified themselves as sedentary, predominantly among women, potentially influenced by the distribution of labor-intensive roles (Martínez et al., 2018). Analogous outcomes surfaced in Colombia, where a study covering four cities revealed that 40.9% of Higher Education students scarcely engaged in exercise, particularly prominent among women (Fernández & Silva, 2018). Colombia's landscape further shed light on the discrepancy in PA levels, demonstrating that merely 21% of university students register high PA levels, with a contrasting 54.8% classified in the low category—attributing a larger proportion to women (Guerrero et al., 2015). Correspondingly, Argentina and Cuba reinforced the gender-dependent variations in energy expenditure and PA engagement, affirming the pattern of higher PA levels among men, mirrored by elevated energy expenditure in vigorous PA (Castañeda-Vázquez et al., 2016; Hidalgo-Rasmussen et al., 2013; Pérez et al., 2014). This manifests in nuances within specific disciplines, such as engineering, potentially aligned with differences in perceived pleasure from exercise (Castañeda-Vázquez et al., 2016; Hidalgo-Rasmussen et al., 2013). What could explain the difference between men and women in engineering.

The pandemic's impact on PA levels becomes glaringly evident, attributed to governmental measures encompassing gym closures and educational institution shutdowns. These restrictions culminated in a notable drop, on average between 35% and 40%, in the level and intensity of PA (Bertrand et al., 2021). However, a silver lining emerges for those who were already active before the pandemic, as they persisted in their PA routines, primarily to alleviate physical stress (López-Valenciano et al., 2021).

A closer inspection of disciplines reveals the intriguing facet of Physical Education and Nutrition students outshining their counterparts in PA levels. This trend could be ascribed to a limited recognition of PA's protective role in health among students from other majors (Chales-Aoun et al., 2019). This variance might also stem from the structured incorporation of exercise in the curriculum of these disciplines.

This research is the only one that reports PA levels in university students in times of pandemic. In addition, the strength of this study is that it used a questionnaire that is easy to apply and that allows the evaluation of many people in a short time, so that different researchers can perform similar studies in different populations and in different age ranges.

Finally, this study is not free of limitations, one of them being the technology to measure PA levels, since this variable can be measured more accurately by accelerometers and deliver greater precision in research. Although the IPAQ questionnaire is validated, there may be biases in the results.

Future studies should compare university students from different universities, careers and areas of Chile, in order to investigate variables that could intervene such as climate, geographical areas or some that are related to the emphasis given by different universities and careers and that, finally, could encourage PA and healthy lifestyles among their students.

Other research could delve deeper into the motivations or barriers that students have for doing PA and seeking a higher energy cost, in order to glimpse actions that can motivate change and a better quality of life, both in the subjects studied and in public health in general. It would be essential to consider the importance of habits and lifestyles at this stage, as well as the implications for present and future health and physical and emotional state.

The uniqueness of this research stems from its exclusive spotlight on PA levels in university students during a pandemic, fostering the potential for replication across diverse populations and age groups, owing to the utilization of an easily administered questionnaire. However, it's important to acknowledge the study's limitations, including the potential for measurement biases inherent in the questionnaire, which might be mitigated through more accurate technology like accelerometers.

Future studies could contemplate broader geographical and climatic comparisons among students, delving into motivational factors and barriers influencing PA engagement. Ultimately, these insights bear significance in enhancing the quality of life, both at individual and public health levels, underscoring the indispensable link between habits, lifestyles, and holistic well-being.

CONCLUSION

An examination of the pandemic's impact reveals compelling PA gender differentials. Male students emerged as more engaged in work-related activities during these challenging times compared to their female counterparts. Yet, a distinctive narrative unfolds although male students recorded higher work involvement and physical activity, the average physical activity levels of female students maintained a superior stance. Notably, the engineering discipline unveils an interesting dimension, with male students exhibiting higher energy expenditure compared to their female counterparts. This discerning insight has vital implications, offering a valuable vantage point for university authorities. The data suggests a strategic avenue for promoting physical activity initiatives, with a pronounced focus on women. Acknowledging the potential pandemic-induced declines in crucial physiological capacities, these findings signal the urgency of prioritizing tailored physical activity programs for female students. By nurturing physical wellness, these initiatives could serve as a proactive shield against diminishing physiological vitality, fortifying the foundations of a resilient and thriving life.

REFERENCES

Barrera-Herrera, A., & Vinet, E. V. (2017). Adultez Emergente y características culturales de la etapa en universitarios chilenos. *Terapia Psicológica, 35*(1), 47–56. https://doi.org/10.4067/S0718-48082017000100005

Bertrand, L., Shaw, K. A., Ko, J., Deprez, D., Chilibeck, P. D., & Zello, G. A. (2021). The impact of the coronavirus disease 2019 (COVID-19) pandemic on university students' dietary intake, physical activity, and sedentary behaviour. *Applied Physiology, Nutrition, and Metabolism, 46*(3), 265–272. https://doi.org/10.1139/apnm-2020-0990

Castañeda-Vázquez, C., Campos-Mesa, M. del C., & Castillo-Andrés, Ó. D. (2016). Actividad física y percepción de salud de los estudiantes universitarios. *Revista de la Facultad de Medicina, 64*(2), 277–284. https://doi.org/10.15446/revfacmed.v64n2.53068

Celis-Morales, C., Livingstone, K. M., Affleck, A., Navas-Carretero, S., San-Cristobal, R., Martinez, J. A., Marsaux, C. F. M., Saris, W. H. M., O'Donovan, C. B., Forster, H., Woolhead, C., Gibney, E. R., Walsh, M. C., Brennan, L., Gibney, M., Moschonis, G., Lambrinou, C.-P., Mavrogianni, C., Manios, Y., …, Food4Me Study. (2018). Correlates of overall and central obesity in adults from seven European countries: Findings from the Food4Me Study. *European Journal of Clinical Nutrition, 72*, 207-218. https://doi.org/10.1038/s41430-017-0004-y

Celis-Morales, C., Salas-Bravo, C., Yáñez, A., & Castillo, M. (2020). Inactividad física y sedentarismo. La otra cara de los efectos secundarios de la Pandemia de COVID-19. *Revista Médica de Chile, 148*(6), 885–886. https://doi.org/10.4067/S0034-98872020000600885

Chales-Aoun, A. G., & Merino Escobar, J. M. (2019). Actividad física y alimentación en estudiantes universitarios chilenos. *Ciencia y Enfermería, 25*, 16. https://doi.org/10.4067/s0717-95532019000100212

Cristi-Montero, C., Celis-Morales, C., Ramírez-Campillo, R., Aguilar-Farías, N., Álvarez, C., & Rodríguez-Rodríguez, F. (2015). Sedentary behaviour and physical inactivity is not the same!: An update of concepts oriented towards the prescription of physical exercise for health. *Revista Médica de Chile, 143*(8), 1089–1090. https://doi.org/10.4067/S0034-98872015000800021

Díaz Martínez, X., Mena Bastías, C., Celis-Morales, C., Salas, C., & Valdivia Moral, P. (2015). Efecto de un programa de actividad física y alimentación saludable aplicado a hijos y padres para la prevención de la obesidad infantil. *Nutrición Hospitalaria, 32*(1), 110–117. https://doi.org/10.3305/nh.2015.32.1.9122

Estrella, L., Castañeda, C., Sánchez, J., & Zaharia, M. (2014). New version of the Declaration of Helsinki: shortcomings to resolve. *Revista Peruana de Medicina Experimental y Salud Pública, 31*(4), 803–804. https://doi.org/10.17843/rpmesp.2014.314.139

Farinola, M., & Bazán, N. (2010). Niveles de actividad física en estudiantes de la carrera de profesorado universitario en educación física y de otras carreras de grado en la Universidad de Flores. *Calidad de Vida y Salud, 3*(1), 25-44. http://revistacdvs.uflo.edu.ar/index.php/CdVUFLO/article/view/27

Fernández, S. A. & Silva, M. (2018). *Relaciones entre la práctica de ejercicio físico y el cuidado* [Tesis de maestría, Pontificia Universidad Javeriana]. https://doi.org/10.11144/Javeriana.10554.35042

Gaete, V. (2015). Desarrollo psicosocial del adolescente. *Revista Chilena de Pediatría, 86*(6), 436–443. https://doi.org/10.1016/j.rchipe.2015.07.005

Guamialamá-Martínez, J., & Salazar-Duque, D. (2018). Evaluación antropométrica según el Indice de Masa Corporal en universitarios de Quito. *Revista de Salud Pública, 20*(3), 314–318. https://doi.org/10.15446/rsap.v20n3.65855

Guerrero Pepinosa, N. Y., Muñoz Ortiz, R. F., Muñoz Martínez, A. P., Pabón Muñoz, J. V., Ruiz Sotelo, D. M., & Sánchez, D. S. (2015). Nivel de sedentarismo en los estudiantes de fisioterapia de la Fundación Universitaria María Cano, Popayán. *Hacia la Promoción de la Salud, 20*(2), 77–89. https://doi.org/10.17151/hpsal.2015.20.2.5

Hall-López, J., & Ochoa-Martínez, P. (2020). Enseñanza virtual en educación física en primaria en México y la pandemia por COVID-19. *Ciencias de la Actividad Física UCM, 21*(2), 1-7. https://doi.org/10.29035/rcaf.21.2.4

Hidalgo-Rasmussen, C. A., Ramírez-López, G., & Hidalgo-San Martín, A. (2013). Actividad física, conductas sedentarias y calidad de vida en adolescentes universitarios de Ciudad Guzmán, Jalisco, México. *Ciência & Saúde Coletiva, 18*(7), 1943–1952. https://doi.org/10.1590/S1413-81232013000700009

López-Valenciano, A., Suárez-Iglesias, D., Sanchez-Lastra, M. A., & Ayán, C. (2021). Impact of COVID-19 Pandemic on University Students' Physical Activity Levels: An Early Systematic Review. *Frontiers in Psychology, 11,* 624567. https://doi.org/10.3389/fpsyg.2020.624567

Martínez, M. A., Leiva, A. M., Petermann, F., Garrido, A., Díaz, X., Álvarez, C., Salas, C., Cristi, C., Rodríguez, F., Aguilar, N., Ramírez, R., Celis, C. (2018). Factores asociados a sedentarismo en Chile: Evidencia de la Encuesta Nacional de Salud 2009-2010. *Revista Médica de Chile, 146*(1), 22–31. https://doi.org/10.4067/s0034-98872018000100022

Morales, G. R., Balboa-Castillo, T., Muñoz, S., Belmar, C., Soto, Á., Schifferli, I., & Guillen-Grima, F. (2017). Asociación entre factores de riesgo cardiometabólicos, actividad física y sedentarismo en universitarios chilenos. *Nutrición Hospitalaria, 34*(6), 1345–1352. https://www.nutricionhospitalaria.org/articles/01060/show

Park, A. H., Zhong, S., Yang, H., Jeong, J., & Lee, C. (2022). Impact of COVID-19 on physical activity: A rapid review. *Journal of Global Health, 12,* 05003. https://doi.org/10.7189/jogh.12.05003

Pérez Ugidos, Guillermo, Lanío, Fernando A., Zelarayán, Julio, & Márquez, Sara. (2014). Actividad física y hábitos de salud en estudiantes universitarios argentinos. *Nutrición Hospitalaria, 30*(4), 896-904. https://scielo.isciii.es/scielo.php?script=sci_arttext&pid=S0212-16112014001100026&lng=es&nrm=iso&tlng=es

Rodríguez, R. F., Palma, L. X., Romo, B. Á., Escobar, B. D., Aragú, G.B., Espinoza, O. L., McMillan, L. N., & Gálvez, C. J. (2013). Hábitos alimentarios, actividad física y nivel socioeconómico en estudiantes universitarios de Chile. *Nutrición Hospitalaria, 28*(2), 447–455. https://doi.org/10.3305/nh.2013.28.2.6230

Rodríguez-Rodríguez, F., Cristi-Montero, C., Villa-González, E., Solís-Urra, P., & Chillón, P. (2018). Comparación de los niveles de actividad física durante la vida universitaria. *Revista Médica de Chile, 146*(4), 442–450. https://doi.org/10.4067/s0034-98872018000400442

Rosa-Guillamón, A. (2019). Análisis de la relación entre salud, ejercicio físico y condición física en escolares y adolescentes. *Ciencias de la Actividad Física UCM, 20*(1), 1-15. https://doi.org/10.29035/rcaf.20.1.1

Rubio Henao, R. F., & Varela Arevalo, M. T. (2016). Barreras percibidas en jóvenes universitarios para realizar actividad física. *Revista Cubana de Salud Pública, 42*(1). https://www.medigraphic.com/cgi-bin/new/resumen.cgi?IDARTICULO=64983

Sánchez Ruiz-Cabello, F. J., Campos Martínez, A. M., Vega de Carranza, M., Cortés Rico, O., Esparza Olcina, M. J., Galbe Sánchez-Ventura, J., Gallego Iborra, A., García Aguado, J., Pallás Alonso, C. R., Rando Diego, Á., San Miguel Muñoz, M. J., Colomer Revuelta, J., & Mengual Gil, J. M. (2019). Promoción de la actividad física en la infancia y la adolescencia (parte 1). *Pediatría Atención Primaria, 21*(83), 279-291. http://scielo.isciii.es/scielo.php?script=sci_arttext&pid=S1139-76322019000300019&lng=es&tlng=es

Serón, P., Muñoz, S., & Lanas, F. (2010). Nivel de actividad física medida a través del cuestionario internacional de actividad física en población chilena. *Revista Médica de Chile, 138*(10), 1232–1239. https://doi.org/10.4067/S0034-98872010001100004

Smith, K. L., Kerr, D. A., Fenner, A. A., & Straker, L. M. (2014). Adolescents just do not know what they want: A qualitative study to describe obese adolescents' experiences of text messaging to support behavior change maintenance post intervention. *Journal of Medical Internet Research, 16*(4), e103. https://doi.org/10.2196/jmir.3113

Solís-Urra, P. A. (2016). Comportamiento sedentario vs inactividad física en universitarios. *Universidad y Salud, 18*(3), 413–416. https://revistas.udenar.edu.co/index.php/usalud/article/view/2848

Tohi, M., Bay, J. L., Tu'akoi, S., & Vickers, M. H. (2022). The Developmental Origins of Health and Disease: Adolescence as a Critical Lifecourse Period to Break the Transgenerational Cycle of NCDs—A Narrative Review. *International Journal of Environmental Research and Public Health, 19*(10), 6024. https://doi.org/10.3390/ijerph19106024

Yang, Y. J. (2019). An Overview of Current Physical Activity Recommendations in Primary Care. *Korean Journal of Family Medicine, 40*(3), 135–142. https://doi.org/10.4082/kjfm.19.0038

Dirección para correspondencia

Iván Molina- Márquez
Magíster en Ciencias de la Salud y el Deporte
Grupo de investigación AFSYE
Universidad Adventista de Chile, Chillán, Chile.

ORCID: https://orcid.org/0000-0001-6003-5107
Contacto: ivanmolina@unach.cl

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