

RELACIÓN ENTRE LOS NIVELES DE ACTIVIDAD FÍSICA Y LA SALUD MENTAL DURANTE EL TIEMPO DE PANDEMIA POR COVID-19

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RESUMEN

Objetivo: Determinar el cumplimiento de las recomendaciones de actividad física, el comportamiento sedentario y la salud mental en adultos durante el tiempo de la pandemia por COVID-19.

Materiales y Métodos: Se realizó un estudio descriptivo de corte transversal en 550 adultos de la Región Caribe de Colombia. Se aplicó el Cuestionario Internacional de Actividad Física (IPAQ) formato corto para evaluar la actividad física, el comportamiento sedentario se evaluó mediante autoreporte del tiempo frente a pantallas y trabajando y la Escala de Depresión, Ansiedad y Estrés (DASS 21) para la salud mental.

Resultados: Se evidenció que los participantes dedican en promedio $4,9 \pm 3,3$ horas/día estar sentando trabajando y $4,5 \pm 3,3$ horas/día frente al computador. Con respecto a la actividad física, se encontró que realizan $85,2 \pm 193,1$ minutos actividad física vigorosa. Además, se halló una significancia estadística entre los niveles altos y bajos de actividad física con aquellos que no presentan síntomas de depresión ($p < 0,002$), ansiedad ($p < 0,019$) y estrés ($p < 0,017$).

Conclusiones: La pandemia por COVID 19 en la población estudiada ocasionó una disminución de la actividad física, aumento de la conducta sedentaria y los niveles de ansiedad. Al relacionar los niveles de actividad física con la salud mental se encontró que los síntomas eran mínimos, siendo posible que la actividad física puede ser un factor protector ante el desarrollo de enfermedades de salud mental. Por lo tanto, se recomienda realizar actividad física de fácil ejecución para mantener un buen estado de salud mental y reducir el comportamiento sedentario.

Palabras clave: COVID-19, actividad física, salud mental, conducta sedentaria

ABSTRACT

Objective: To determine compliance with physical activity recommendations, sedentary behavior and mental health in adults during the time of the COVID-19 pandemic.

Materials and Methods: A descriptive cross-sectional study was conducted in 550 adults in the Caribbean Region of Colombia. The International Physical Activity Questionnaire (IPAQ) short format was applied to assess physical activity, sedentary behavior was assessed by self-reporting time in front of screens and working, and the Depression, Anxiety and Stress Scale (DASS 21) was used to assess mental health.

Results: It was found that participants spent an average of 4.9 ± 3.3 hours/day sitting at work and 4.5 ± 3.3 hours/day in front of the computer. With respect to physical activity, it was found that they performed 85.2 ± 193.1 minutes of vigorous physical activity. In addition, statistical significance was found between high and low levels of physical activity with those without symptoms of depression ($p < 0.002$), anxiety ($p < 0.019$) and stress ($p < 0.017$).

Conclusions: The COVID 19 pandemic in the population studied caused a decrease in physical activity, increased sedentary behavior and anxiety levels. When physical activity levels were related to mental health, it was found that symptoms were minimal, and it is possible that physical activity may be a protective factor against the development of mental health diseases. Therefore, it is recommended to perform physical activity of easy execution to maintain a good mental health status and reduce sedentary behavior.

Key words: COVID-19, Exercise, mental health, sedentary behavior.

REFERENCIAS (colocar a cada artículo el DOI o la URL en caso de no tener DOI)

1. World Health Organization (WHO). WHO Guidelines on Physical Activity and Sedentary Behaviour. Geneva; 2020. <https://www.who.int/publications/i/item/9789240015128>.
2. Organización Mundial de la Salud (OMS). (2020). Actividad Física. Recuperado de <https://www.who.int/es/news-room/fact-sheets/detail/physical-activity>
3. Instituto Nacional de Bienestar Familiar. Encuesta Nacional de Situación Nutricional (ENSIN) 2015. Bogotá D.C.; 2015. <https://www.icbf.gov.co/bienestar/nutricion/encuesta-nacional-situacion-nutricional>.
4. Organización Mundial de la Salud (OMS). COVID-19: cronología de la actuación de la OMS. Abril 2020. <https://www.who.int/es/news/item/27-04-2020-who-timeline---covid-19>.
5. Sedano-Chiroque FL, Rojas-Miliano C, Vela-Ruiz JM. COVID-19 desde la perspectiva de la prevención primaria. Rev. Fac. Med. Hum. 2020; 20(3): 494-501. doi.org/10.25176/rfmh.v20i3.3031.
6. Ramírez-Ortiz J, Castro-Quintero D, Lerma-Córdoba C, Yela-Ceballos F, Escobar-Córdoba F. Consecuencias de la pandemia de la COVID-19 en la salud mental asociadas al aislamiento social. Rev. colomb. Anestesiología. 2020; 48(4): e301. doi.org/10.5554/22562087.e930.
7. Liu S, Yang L, Zhang C, Xiang YT, Liu Z, Hu S, Zhang B. Online mental health services in China during the COVID-19 outbreak. Lancet Psychiatry. 2020; 7(4): e17-e18. doi: 10.1016/S2215-0366(20)30077-8.
8. Gamboa Suárez AA, Hernández Suárez CA, Prada Nuñez R. Efectos depresivos del aislamiento preventivo obligatorio asociados a la pandemia del COVID-19 en docentes y estudiantes de una universidad pública en Colombia: Psicogente. 2020; 24(45):1-20. doi.org/10.17081/psico.24.45.4156
9. Parrado-González A, León-Jariego J. COVID-19: Factores asociados al malestar emocional y morbilidad psíquica en población española. Rev Esp Salud Pública.

2020;

94:

1-16.

https://www.mscbs.gob.es/biblioPublic/publicaciones/recursos_propios/resp/revista_cdrom/VOL94/ORIGINALES/RS94C_202006058.pdf.

10. Severi C, Medina M. Cambios en los hábitos alimentarios y actividad física durante el aislamiento físico durante el COVID -19:. An Facultad Med. 2020; 7(1): e2020v7n1a15. doi: 10.14642/RENC.2020.26.2.5213.
11. Fitbit. The Impact of Coronavirus on Global Activity. Report. 2020. Disponible en:<https://blog.fitbit.com/covid-19-global-activity/>
12. Chandrasekaran B, Ganesan TB. Sedentarism and chronic disease risk in COVID 19 lockdown - a scoping review. Scott Med J. 2021; 66(1):3-10. doi: 10.1177/0036933020946336.
13. Organización Mundial de la Salud (OMS). Enfermedades no transmisibles. Genova; 2109. <https://www.who.int/es/news-room/fact-sheets/detail/noncommunicable-diseases>.
14. Rangel YR, Morejón SR, Cabrera MY, Herranz BD, Rodríguez OW. Therapeutic adherence, level of knowledge of the disease and self-esteem in type 2 diabetic patients. Gac Méd Espirit. 2018; 20 (3): 13-23. <https://www.medigraphic.com/pdfs/espirtuana/gme-2018/gme183b.pdf>
15. Parra-Soto S, Martínez-Sanguinetti M, Cigarroa I, Diaz-Martínez X, Matus-Castillo C, Garrido-Méndez A, et al. ¿Cuál es la asociación entre actividad física, sedentarismo y riesgo de desarrollar cáncer en población adulta? Una revisión de la literatura. Rev. chil. nutr. 2021; 48(2): 245-254. doi.org/10.4067/S0717-75182021000200245
16. Prieto BDH, Correa BJE, Ramírez VR. Niveles de actividad física, condición física y tiempo en pantallas en escolares de Bogotá, Colombia: Estudio FUPRECOL. Nutr Hosp. 2015; 32(5): 2184-2192. doi:10.3305/nh.2015.32.5.9576.
17. Arévalo H, Urina M, Santacruz J. Impacto del aislamiento preventivo obligatorio en la actividad física diaria y en el peso de los niños durante la pandemia por SARS-CoV-2. Rev. Colomb. Cardiol. 2020; 27 (6): 575-582. doi.org/10.1016/j.rccar.2020.09.003

18. Rodríguez-Romo G, Barriopedro M, Alonso SP, Garrido-Muñoz M. Relaciones entre Actividad Física y Salud Mental en la Población Adulta de Madrid. *Rev. psicol. deport.* 2015;24(2):233-239. <https://www.redalyc.org/pdf/2351/235141413005.pdf>
19. Jacob L, Tully MA, Barnett Y, Lopez-Sanchez G, Butler L, Schuch F, et al. The relationship between physical activity and mental health in a sample of the UK public: A cross-sectional study during the implementation of COVID-19 social distancing measures. *Ment. Health Phys. Act.* 2020; 19: doi.org/10.1016/j.mhpa.2020.100345
20. Dinler E, Badat T, Kocamaz D, Yakut Y. Evaluation of the physical activity, sleep quality, depression, and life satisfaction of university students during the COVID-19. *Int J Disabil Sports Health Sci.* 2020; 3(2): 128-139. doi.org/10.33438/ijdshts.770346
21. Stockwell S, Trott M, Tully M, Shin J, Barnett Y, Butler L, et al. Changes in physical activity and sedentary behaviours from before to during the COVID-19 pandemic lockdown: a systematic review. *BMJ Open Sport Exerc Med.* 2021; 7(1):e000960. [doi: 10.1136/bmjsem-2020-000960](https://doi.org/10.1136/bmjsem-2020-000960).
22. Naciones Unidas. Objetivos de Desarrollo Sostenible. <https://www.un.org/sustainabledevelopment/es/health/>
23. República de Colombia. Ministerio de Salud y Protección Social. La importancia de la actividad física como hábito de vida saludable. Boletín de Prensa No 002 de 2021. <https://www.minsalud.gov.co/Paginas/La-importancia-de-la-actividad-fisica-como-habito-de-vida-saludable.aspx>
24. Organización Mundial de la Salud (OMS). Coronavirus. Ginebra; 2020. https://www.who.int/es/health-topics/coronavirus#tab=tab_1
25. Cervera-Martínez J, Atienza-Carbonell B, Mota JC, Bobes-Bascarán T, Crespo-Facorro B, Esteban C, et al. Lifestyle changes and mental health during the COVID-19 pandemic: A repeated, cross-sectional web survey. *J Affect Disord.* 2021; 295:173-182. [doi:10.1016/j.jad.2021.08.020](https://doi.org/10.1016/j.jad.2021.08.020)
26. Rawat D, Dixit V, Gulati S, Gulati S, Gulati A. Impact of COVID-19 outbreak on lifestyle behaviour: A review of studies published in India. *Diabetes Metab Syndr Clin Res Rev.* 2021;15(1):331-336. doi.org/10.1016/j.dsx.2020.12.038

27. Totosy de Zepetnek JO, Martin J, Cortes N, Caswell S, Boolani A. Influence of grit on lifestyle factors during the COVID-19 pandemic in a sample of adults in the United States. *Pers Individ Dif.* 2021; 175:110705. doi:10.1016/j.paid.2021.110705
28. Sánchez OM, De Luna BE. Hábitos de vida saludable en la población universitaria. *Nutr Hosp.* 2015; 31 (5):1910-1919. doi:10.3305/nh.2015.31.5.8608
29. Egger G. Healthy living. *Aust Fam Physician.* 2017; 46 (1): 10-13. <https://www.racgp.org.au/download/Documents/AFP/2017/Jan-Feb/AFP-Jan-Feb-2017-Focus-Egger.pdf>
30. Gooding H, Shay C, Ning H, Gillman M, Chiuve S, Reis J, et al. Optimal lifestyle components in young adulthood are associated with maintaining the ideal cardiovascular health profile into middle age. *J Am Heart Assoc.* 2015; 4 (11): 1-9. doi: 10.1161/JAHA.115.002048.
31. Mize TD. Profiles in health: Multiple roles and health lifestyles in early adulthood. *Soc Sci Med.* 2017; 178: 196-205. doi: 10.1016/j.socscimed.2017.02.017
32. Foth T, Holmes D. Governing through lifestyle-Lalonde and the biopolitical management of public health in Canada. *Nurs Philos.* 2018 Oct;19(4):e12222. doi: 10.1111/nup.12222.
33. Roberti di Sarsina P, Tassinari M. Integrative approaches for health: Biomedical research, ayurveda, and yoga. *J Ayurveda Integr Med.* 2015 Jul-Sep;6(3):213-4. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4630699/pdf/JAIM-6-213.pdf>
34. Rippe JM. Lifestyle Medicine 2019: Deeper, Broader, and More Precise. *Am J Lifestyle Med.* 2019;13(5):436-439. doi: 10.1177/1559827619845342.
35. James PA, Oparil S, Carter BL, Cushman WC, Dennison-Himmelfarb C, Handler J, Lackland D, et al. 2014 evidence-based guideline for the management of high blood pressure in adults: report from the panel members appointed to the Eighth Joint National Committee. *JAMA.* 2014;311(5):507-520. doi:10.1001/jama.2013.284427.
36. Farhud DD. Impact of Lifestyle on Health. *Iran J Public Health.* 2015 Nov;44(11):1442-1444. <https://europepmc.org/article/PMC/4703222>

37. Cureau FV, Sparrenberger K, Bloch KV, Ekelund U, Schaan BD. Associations of multiple unhealthy lifestyle behaviors with overweight/obesity and abdominal obesity among Brazilian adolescents: A country-wide survey. *Nutr Metab Cardiovasc Dis.* 2018;28(7):765-774. doi:10.1016/j.numecd.2018.04.012
38. National Center for Health Statistics (US). Health, United States, 2008: With Special Feature on the Health of Young Adults. Hyattsville (MD): National Center for Health Statistics (US); 2009 Mar. Report No.: 2009-1232. <https://www.cdc.gov/nchs/data/hus/hus08.pdf>
39. Tremblay MS, on behalf of SBRN Terminology Consensus Project Participants, Aubert S, Barnes JD, Saunders TJ, Carson V, et al. Sedentary Behavior Research Network (SBRN) – Terminology Consensus Project process and outcome. *Int J Behav Nutr Phys Act.* 2017; 14(1):75. doi: 10.1186/s12966-017-0525-8.
40. Pate RR, O'Neill JR, Lobelo F. The evolving definition of "sedentary". *Exerc Sport Sci Rev.* 2008;36(4):173-178. doi: 10.1097/JES.0b013e3181877d1a
41. Owen N, Healy GN, Matthews CE, Dunstan DW. Too much sitting: the population health science of sedentary behavior. *Exerc Sport Sci Rev.* 2010;38(3):105-113. doi: 10.1097/JES.0b013e3181e373a2
42. Botero JP, Farah BQ, Correia M de A, Lofrano-Prado MC, Cucato GG, Shumate G, et al. Impact of the COVID-19 pandemic stay at home order and social isolation on physical activity levels and sedentary behavior in Brazilian adults. *Einstein.* 2021;19: eAE6156. doi: 10.31744/einstein_journal/2021AE6156
43. Centers for Disease Control and Prevention. Physical Activity Basics. ¿Cuánta actividad física necesitan los adultos? U.S. Department of Health and Human Services; 2020. Disponible en: <https://www.cdc.gov/physicalactivity/basics/adults/index.htm>
44. National Heart, Lung and Blood Institute (NIH). Physical Activity and Your Heart. U.S.A. Disponible en: <https://www.nhlbi.nih.gov/health-topics/physical-activity-and-your-heart>
45. Ministerio de la Protección Social, Departamento Administrativo del Deporte, la Recreación, la Actividad Física y el Aprovechamiento del Tiempo Libre -

- COLDEPORTES. Hábitos y Estilos de Vida Saludable. Tomo 2. Documento técnico con los contenidos de direccionamiento pedagógico para la promoción de hábitos de vida saludable, con énfasis en alimentación saludable y el fomento de ambientes 100% libres de humo de cigarrillo a través de la práctica regular de la actividad física cotidiana, dirigidos a los referentes de las entidades territoriales. Bogotá D.C, Colombia; 2011.
<https://www.javeriana.edu.co/documents/245769/305029/Habitos+y+Estilos+de+Vida+Saludable+TOMO+2/6b664115-0b42-4262-8f05-18b7caa3d1bc>
46. Posada JA. La salud mental en Colombia. *Biomédica*. 2013; 33 (4): 497-498. doi.org/10.7705/biomedica.2214
47. Organización Mundial de la Salud. *Salud Mental*. Ginebra; 2017. https://www.who.int/topics/mental_health/es/
48. American Psychiatric Association. *What Is Depression?*. Washington; 2020 <https://www.psychiatry.org/patients-families/depression/what-is-depression>
49. González N, Martínez A, Carmona O, Viera C, Jerez D, González J. Tratamiento acupuntural para la ansiedad en la consulta de medicina tradicional. *Policlínico Baracoa*, 2010. *Panorama Cuba y Salud*. 2011; 6: 142-143. <https://www.redalyc.org/pdf/4773/477348946043.pdf>
50. Mental Health UK 2020. *Mental Health UK. What is anxiety?* <https://mentalhealth-uk.org/help-and-information/conditions/anxiety-disorders/what-is-anxiety/>
51. Andreu CE. Actividad física y efectos psicológicos del confinamiento por covid-19. *Revista INFAD de Psicología*. 2020; 2 (1): 209-220. doi: doi.org/10.17060/ijodaep.2020.n1.v2.1828
52. González S, Sarmiento O, Lozano O, Ramirez A, Grijalba C. Niveles de actividad física de la población colombiana: desigualdades por sexo y condición socioeconómica. *Biomédica*. 2014; 34:447-459. doi:10.7705/biomedica.v34i3.2258
53. Bauman AE, Reis RS, Sallis JF, Wells JC, Loos RJ, Martin BW, et al. Correlates of physical activity: why are some people physically active and others not? *Lancet*. 2012;380(9838):258-271. doi: 10.1016/S0140-6736(12)60735-1.

54. Petersen JM, Kemps E, Lewis LK, Prichard I. Promoting physical activity during the COVID-19 lockdown in Australia: The roles of psychological predictors and commercial physical activity apps. *Psychol Sport Exerc.* 2021; 56:102002. doi:10.1016/j.psychsport.2021.102002
55. Bakhsh MA, Khawandanah J, Naaman RK, Alashmali S. The impact of COVID-19 quarantine on dietary habits and physical activity in Saudi Arabia: a cross-sectional study. *BMC Public Health.* 2021;21(1):1487. doi: 10.1186/s12889-021-11540-y.
56. Manuel DG, Eddeen AB, Colley RC, Tjepkema M, Garner R, Bennett C, et al. The effect of COVID-19 on physical activity among Canadians and the future risk of cardiovascular disease. *Statcan.gc.ca.* 2021. Catalogue no. 45-28-0001. <https://www150.statcan.gc.ca/n1/en/pub/45-28-0001/2021001/article/00019-eng.pdf?st=NpISle8D>
57. Romero-Blanco C, Rodríguez-Almagro J, Onieva-Zafra MD, Parra-Fernández ML, Prado-Laguna MDC, Hernández-Martínez A. Physical Activity and Sedentary Lifestyle in University Students: Changes during Confinement Due to the COVID-19 Pandemic. *Int J Environ Res Public Health.* 2020;17(18):6567. doi: 10.3390/ijerph17186567
58. Meyer J, McDowell C, Lansing J, Brower C, Smith L, Tully M, et al. Changes in Physical Activity and Sedentary Behavior in Response to COVID-19 and Their Associations with Mental Health in 3052 US Adults. *Int J Environ Res Public Health.* 2020;17(18):6469. doi.org/10.3390/ijerph17186469
59. Watson, K.B., Whitfield, G.P., Huntzicker, G., Omura, J.D., Ussery, E., Chen, T.J., et al. Cross-sectional study of changes in physical activity behavior during the COVID-19 pandemic among US adults. *Int J Behav Nutr Phys Act.* 2021; 18(1):91. doi.org/10.1186/s12966-021-01161-4.
60. Pears M, Kola-Palmer S, De Azevedo LB. The impact of sitting time and physical activity on mental health during COVID-19 lockdown. *Sport Sci Health.* 2021; 10:1-13. doi: 10.1007/s11332-021-00791-2.

61. McBride E, Arden MA, Chater A, Chilcot J. The impact of COVID-19 on health behaviour, well-being, and long-term physical health. *Br J Health Psychol.* 2021;26(2):259-270. doi: 10.1111/bjhp.12520
62. Malta DC, Szwarcwald CL, Barros MBA, Gomes CS, Machado IE, Souza Júnior PRB, et al. El COVID-19 Pandemia y cambios en los estilos de vida de adultos brasileños: un estudio transversal, 2020. *Epidemiol Serv Saude.* 2020; 29(4): e2020407. doi: 10.1590 / S1679-49742020000400026.
63. Rodríguez-Larra A, Mañas A, Labayen I, González-Gross M, Espin A, Aznar S, et al. Impact of COVID-19 confinement on physical activity and sedentary behaviour in spanish university students: Role of gender. *Int J Environ Res Public Health.* 2021 18(2):369. doi: 10.3390/ijerph18020369
64. Bertrand L, Shaw KA, Ko J, Deprez D, Chilibeck PD, Zello GA. The impact of the coronavirus disease 2019 (COVID-19) pandemic on university students' dietary intake, physical activity, and sedentary behaviour. *Appl Physiol Nutr Metab.* 2021;46(3):265-272. doi: 10.1139/apnm-2020-0990
65. Barwais FA. Assessing physical activity and sedentary time during the COVID-19 pandemic using self-reported measurement. *Natl J Physiol Pharm Pharmacol.* 2020;10(11): 1019-1024. doi: 10.09241202001102020
66. Jacob L, Tully MA, Barnett Y, Lopez-Sanchez GF, Butler L, Schuch F, et al. The relationship between physical activity and mental health in a sample of the UK public: A cross-sectional study during the implementation of COVID-19 social distancing measures. *Ment Health Phys Act.* 2020; 19:100345. doi: 10.1016/j.mhpa.2020.100345.
67. Dziewior J, Carr L, Pierce G, Whitaker K. Physical activity and sedentary behavior in college students during the covid-19 pandemic. *Med Sci Sports Exerc.* 2021;53(8S):184-185. doi: 10.1249/01.mss.0000761204.78353.d8.
68. Ministerio de Salud y Protección Social. Resolución 3280 de 2018. Bogotá; 2018. <https://www.minsalud.gov.co/sites/rid/Lists/BibliotecaDigital/RIDE/DE/DIJ/resolucion-3280-de-2018.pdf>
69. Rey-López JP, Tomas C, Vicente-Rodríguez G, Gracia-Marco L, Jiménez-Pavón D, Pérez-Llamas F, et al. Sedentary behaviours and socio-economic status in

- Spanish adolescents: the AVENA study. *Eur J Public Health*. 2011;21(2):151-157. doi: 10.1093/eurpub/ckq035.
70. Clark BK, Winkler E, Healy GN, Gardiner PG, Dunstan DW, Owen N, et al. Adults' past-day recall of sedentary time: reliability, validity, and responsiveness. *Med Sci Sports Exerc*. 2013;45(6):1198-207. doi: 10.1249/MSS.0b013e3182837f57.
71. Barrera R. Cuestionario Internacional de actividad física (IPAQ) Revista Enfermería del Trabajo. 2017;7(2):49-54. <https://dialnet.unirioja.es/servlet/articulo?codigo=5920688>
72. Mella RF, Vinet EV, Alarcón M. Escalas de Depresión, Ansiedad y Estrés (DASS-21): Adaptación y propiedades psicométricas en estudiantes secundarios de Temuco. *Revista Argentina de Clínica Psicológica*. 2014; 23 (2): 179-190. <https://www.redalyc.org/articulo.oa?id=281943265009>
73. Villaquiran AF, Ramos O A, Jácome SJ, Meza MdelM. Actividad física y ejercicio en tiempos de COVID-19. *CES Medicina*. 2020; 34: 51-58. <https://doi.org/10.21615/cesmedicina.34.COVID-19.6>.
74. Mera A, Tabares-Gonzalez E, Montoya-Gonzalez S, Muñoz-Rodríguez D, Monsalve F. Recomendaciones prácticas para evitar el desacondicionamiento físico durante el confinamiento por pandemia asociada a COVID-19. *Universidad Y Salud*. 2020; 22 (2):166-77, doi:10.22267/rus.202202.188.
75. Füzéki E, Banzer W. Physical Activity Recommendations for Health and Beyond in Currently Inactive Populations. *Int J Environ Res Public Health*. 2018;15(5):1042. doi: 10.3390/ijerph15051042.
76. Castañeda-Babarro A, Arbillaga-Etxarri A, Gutiérrez-Santamaría B, Coca A. Physical Activity Change during COVID-19 Confinement. *Int J Environ Res Public Health*. 2020;17(18):6878. doi: 10.3390/ijerph17186878.
77. Kelund U, Steene-Johannessen J, Brown WJ, Fagerland MW, Owen N, Powell KE, et al. Does physical activity attenuate, or even eliminate, the detrimental association of sitting time with mortality? A harmonised meta-analysis of data from more than 1 million men and women. *Lancet*. 2016;388(10051):1302-10. doi: 10.1016/S0140-6736(16)30370-1.

78. Narici M, Vito G, Franchi M, Paoli A, Moro T, Marcolin G, et al. Impact of sedentarism due to the COVID-19 home confinement on neuromuscular, cardiovascular and metabolic health: Physiological and pathophysiological implications and recommendations for physical and nutritional countermeasures. *Eur J Sport Sci.* 2021;21(4):614-635. doi: 10.1080/17461391.2020.1761076.
79. Luciano F, Cenacchi V, Vegro V, Pavei G. COVID-19 lockdown: Physical activity, sedentary behaviour and sleep in Italian medicine students. *Eur J Sport Sci.* 2021;21(10):1459-1468. doi: 10.1080/17461391.2020.1842910.
80. Rahman ME, Islam MS, Bishwas MS, Moonajilin MS, Gozal D. Physical inactivity and sedentary behaviors in the Bangladeshi population during the COVID-19 pandemic: An online cross-sectional survey. *Heliyon.* 2020;6(10):e05392. doi: 10.1016/j.heliyon.2020.e05392.
81. Watson NF, Badr MS, Belenky G, Bliwise DL, Buxton OM, Buysse D, et al. Recommended amount of sleep for a healthy adult: A Joint Consensus Statement of the American Academy of Sleep Medicine and Sleep Research Society. *Journal of Clinical Sleep Medicine.* 2015; 11 (6): 591–592. doi: <https://doi.org/10.5664/jcsm.4758>
82. Chennaoui M, Arnal PJ, Sauvet F, Léger D. Sleep and exercise: a reciprocal issue? *Sleep. Med Rev.* 2015; 20:59-72. doi: 10.1016/j.smrv.2014.06.008.
83. Wang C, Pan R, Wan X, Tan Y, Xu L, Ho CS, et al. Immediate Psychological Responses and Associated Factors during the Initial Stage of the 2019 Coronavirus Disease (COVID-19) Epidemic among the General Population in China. *Int J Environ Res Public Health.* 2020;17(5):1729. doi: 10.3390/ijerph17051729.
84. Roy A, Singh AK, Mishra S, Chinnadurai A, Mitra A, Bakshi O. Mental health implications of COVID-19 pandemic and its response in India. *Int J Soc Psychiatry.* 2021;67(5):587-600. doi: 10.1177/0020764020950769.
85. Fouilloux C, Fouilloux-Morales M, Tafoya SA, Petra-Micu I. Asociación entre actividad física y salud mental positiva en estudiantes de medicina en México: un estudio transversal. *Cuad. psicol. deporte.* 2021;21(3):1-15. Disponible en: <https://revistas.um.es/cpd/article/view/414381>.

86. Tamminen N, Reinikainen J, Appelqvist-Schmidlechner K, Borodulin K, Mäki-Opas T, Solin P. Associations of physical activity with positive mental health: A population-based study. *Mental Health and Physical Activity*. 2020;18: 1755-2966. <https://doi.org/10.1016/j.mhpa.2020.100319>.
87. Schuch FB, Bulzing RA, Meyer J, Vancampfort D, Firth J, Stubbs B, et al. Associations of moderate to vigorous physical activity and sedentary behavior with depressive and anxiety symptoms in self-isolating people during the COVID-19 pandemic: A cross-sectional survey in Brazil. *Psychiatry Res*. 2020; 292:113339. doi: 10.1016/j.psychres.2020.113339.
88. Guerra-Santiesteban J, Gutiérrez-Cruz M, Zavala-Plaza M, Singre-Álvarez J, Goosdenovich-Campoverde D, Romero-Frometa E. Relación entre ansiedad y ejercicio físico. *Revista Cubana de Investigaciones Biomédicas*. 2019; 36 (2). Disponible en: <http://www.revibiomedica.sld.cu/index.php/ibi/article/view/21>.
89. Bertheussen GF, Romundstad PR, Landmark T, Kaasa S, Dale O, Helbostad JL. Associations between Physical Activity and Physical and Mental Health- A HUNT 3 Study. *Medicine & Science in Sports & Exercise*. 2011;43 (7):1220-1228 doi: 10.1249/MSS.0b013e318206c66e.
90. Barbosa-Granados SH, mberto y Aguirre-Loaiza, Haney Actividad física y calidad de vida relacionada con la salud en una comunidad académica. *Pensamiento Psicológico*. 2020;18(2). Disponible en: <https://www.redalyc.org/articulo.oa?id=80164789007>.
91. López-Walle J, Tristán J, Tomás I, Gallegos-Guajardo J, Gongora E, Hernández-Pozo MR. Estrés percibido y felicidad auténtica a través del nivel de actividad física en jóvenes universitarios. *CPD*. 2020; 20(2): 265-275. http://scielo.isciii.es/scielo.php?script=sci_arttext&pid=S1578-84232020000200021&lng=es.
92. Obando IA, Calero S, Carpio P, Fernández A. Efecto de las actividades físicas en la disminución del estrés laboral. *Rev Cubana Med Gen Integr*. 2017;33(3):342-351. Disponible en: <http://www.revmgi.sld.cu/index.php/mgi/article/view/382>.