

## DAFTAR PUSTAKA

- Abdullah, S. R., Nur Zati Iwani, A. K., Ahmad Zamri, L., Wan Mohd Zin, R. M., Abu Seman, N., Zainal Abidin, N. A., Hamzah, S. S., Azizul, N. H., Omar, A., Seman, Z., Yahya, A., & Md Noh, M. F. (2025). Visceral adiposity loss is associated with improvement in cardiometabolic markers: Findings from a dietary intervention study. *Frontiers in Endocrinology*, *16*, 1576599. <https://doi.org/10.3389/fendo.2025.1576599>
- Al-Ghozi, Y. S. A.-G., Sukarno, R. T., Nugraha, Z. S., & Pramaningtyas, M. D. (2024). Hubungan Aktivitas Fisik Terhadap Risiko Terjadinya Sindroma Metabolik Pada Pegawai Kantor PT. PLN Unit Pelaksana Pelayanan Pelanggan (UP3) Daerah Istimewa Yogyakarta. *Berkala Ilmiah Kedokteran Dan Kesehatan Masyarakat (Scientific Periodical Journal Of Medicine And Public Health)*, *2*(2). <https://doi.org/10.20885/bikkm.vol2.iss2.art6>
- Alkhalwaldeh, A., Abdalrahim, A., ALBashtawy, M., Ayed, A., Al Omari, O., ALBashtawy, S., Suliman, M., Oweidat, I. A., Khatatbeh, H., Alkhalwaldeh, H., Dameery, K. A., Alsarairh, M., & Alhroub, N. (2024). University Students' Physical Activity: Perceived Barriers and Benefits to Physical Activity and Its Contributing Factors. *SAGE Open Nursing*, *10*, 23779608241240490. <https://doi.org/10.1177/23779608241240490>
- Argilés, J. M., Campos, N., Lopez-Pedrosa, J. M., Rueda, R., & Rodriguez-Mañas, L. (2016). Skeletal Muscle Regulates Metabolism via Interorgan Crosstalk: Roles in Health and Disease. *Journal of the American Medical Directors Association*, *17*(9), 789–796. <https://doi.org/10.1016/j.jamda.2016.04.019>

- Balboa-Castillo, T., Muñoz, S., Serón, P., Andrade-Mayorga, O., Lavados-Romo, P., & Aguilar-Farias, N. (2023). Validity and reliability of the international physical activity questionnaire short form in Chilean adults. *PLOS ONE*, *18*(10), e0291604. <https://doi.org/10.1371/journal.pone.0291604>
- Baykal, T., & Soyupek, F. (2022). Physical Activity Levels of Medical Students: A global issue to be addressed. *Journal of Contemporary Medicine*, *12*(6), 937–943. <https://doi.org/10.16899/jcm.1190953>
- Blanken, C. P. S., Bayer, S., Buchner Carro, S., Hauner, H., & Holzapfel, C. (2025). Associations Between *TCF7L2*, *PPAR $\gamma$* , and *KCNJ11* Genotypes and Insulin Response to an Oral Glucose Tolerance Test: A Systematic Review. *Molecular Nutrition & Food Research*, *69*(3), e202400561. <https://doi.org/10.1002/mnfr.202400561>
- Cao, X., & Thyfault, J. P. (2023). Exercise drives metabolic integration between muscle, adipose and liver metabolism and protects against aging-related diseases. *Experimental Gerontology*, *176*, 112178. <https://doi.org/10.1016/j.exger.2023.112178>
- Chomiuk, T., Niezgodą, N., Mamcarz, A., & Śliż, D. (2024). Physical activity in metabolic syndrome. *Frontiers in Physiology*, *15*, 1365761. <https://doi.org/10.3389/fphys.2024.1365761>
- Correa-Burrows, P., Burrows, R., Albala, C., Sepúlveda, C., Salech, F., Troncoso, R., Bunout, D., & Gonzalez-Billault, C. (2025). Long-Term Obesity and Biological Aging in Young Adults. *JAMA Network Open*, *8*(7), e2520011. <https://doi.org/10.1001/jamanetworkopen.2025.20011>

- Dharmansyah, D., & Budiana, D. (2021). Indonesian Adaptation of The International Physical Activity Questionnaire (IPAQ): Psychometric Properties. *JURNAL PENDIDIKAN KEPERAWATAN INDONESIA*, 7(2), 159–163.  
<https://doi.org/10.17509/jpki.v7i2.39351>
- Distefano, G., & Goodpaster, B. H. (2018). Effects of Exercise and Aging on Skeletal Muscle. *Cold Spring Harbor Perspectives in Medicine*, 8(3), a029785.  
<https://doi.org/10.1101/cshperspect.a029785>
- Dr. Aris Eddy Sarwono, M. S. A., & Dr. Asih Handayani M. Si., M. P. (2021). *Metode Kuantitatif*. Unisri Press. <https://books.google.co.id/books?id=Tr2bEAAAQBAJ>
- Gehrke, B., Farias, M. L. F., Wildemberg, L. E., Ferraiuoli, G. I., Ribeiro, V., Bosgnoli, R., Paranhos Neto, F. D. P., De Mendonça, L. M. C., Madeira, M., & Coelho, M. C. A. (2025). The importance of muscle strength and physical performance as part of the diagnosis and management of sarcopenia in young adults living with human immunodeficiency virus. *Archives of Endocrinology and Metabolism*, 69(5), 1–8.  
<https://doi.org/10.20945/2359-4292-2025-0018>
- Grivas, G. V. (2025). Comparative analysis of combined exercise programs in middle-aged obese males: Impact on energy expenditure, body composition, and metabolic rate. *Frontiers in Sports and Active Living*, 7, 1533030.  
<https://doi.org/10.3389/fspor.2025.1533030>
- Hall, J. E., & Hall, M. E. (2021). *Guyton and Hall textbook of medical physiology* (14th edition). Elsevier.
- Ibáñez De Opakua, A., Conde, R., De Diego, A., Bizkarguenaga, M., Embade, N., Lu, S. C., Mato, J. M., & Millet, O. (2025). Metabolomic-based aging clocks. *Npj*

*Metabolic Health and Disease*, 3(1), 35. <https://doi.org/10.1038/s44324-025-00078-x>

Jaremków, A., Markiewicz-Górka, I., Hajdusianek, W., Czerwińska, K., & Gać, P. (2023).

The Relationship between Body Composition and Physical Activity Level in Students of Medical Faculties. *Journal of Clinical Medicine*, 13(1), 50. <https://doi.org/10.3390/jcm13010050>

Kim, B. C., Kim, M. K., Han, K., Lee, S.-Y., Lee, S.-H., Ko, S.-H., Kwon, H.-S.,

Merchant, A. T., Yim, H. W., Lee, W.-C., Park, Y. G., & Park, Y.-M. (2015). Low muscle mass is associated with metabolic syndrome only in nonobese young adults: The Korea National Health and Nutrition Examination Survey 2008-2010. *Nutrition Research*, 35(12), 1070–1078.

<https://doi.org/10.1016/j.nutres.2015.09.020>

Kim, S. W., Kim, H. J., Min, K., Lee, H., Lee, S.-H., Kim, S., Kim, J. S., & Oh, B. (2021).

The relationship between smoking cigarettes and metabolic syndrome: A cross-sectional study with non-single residents of Seoul under 40 years old. *PLOS ONE*, 16(8), e0256257. <https://doi.org/10.1371/journal.pone.0256257>

Krzysztofik, M., Wilk, M., Wojdała, G., & Gołaś, A. (2019). Maximizing Muscle

Hypertrophy: A Systematic Review of Advanced Resistance Training Techniques and Methods. *International Journal of Environmental Research and Public Health*, 16(24), 4897. <https://doi.org/10.3390/ijerph16244897>

Laksmi, P. W., Sukma, F. A., Setyohadi, B., Nugroho, P., Ariane, A., & Tirtarahardja, G.

(2019). The Need for a New Cut-off Value to Increase Diagnostic Performance of Bioelectrical Impedance Analysis Compared with Dual-Energy X-ray

- Absorptiometry to Measure Muscle Mass in Indonesian Elderly. *Acta Medica Indonesiana*, 51(2), 95–101.
- Mehrdad, R., Pouragha, H., Vesal, M., Pouryaghoub, G., Naderzadeh, M., & Alemohammad, Z. B. (2021). Metabolic Age: A New Predictor for Metabolic Syndrome. *The Turkish Journal of Endocrinology and Metabolism*, 25(1), 78–86. <https://doi.org/10.25179/tjem.2020-79234>
- Melo, E. A. S. D., Ferreira, L. E. D. S., Cavalcanti, R. J. F., Botelho Filho, C. A. D. L., Lopes, M. R., & Barbosa, R. H. D. A. (2021). Nuances between sedentary behavior and physical inactivity: Cardiometabolic effects and cardiovascular risk. *Revista Da Associação Médica Brasileira*, 67(2), 335–343. <https://doi.org/10.1590/1806-9282.67.02.20200746>
- Mier-Mota, J., Ponce-González, J. G., Perez-Bey, A., Cabanas-Sánchez, V., Veiga-Núñez, O., Santiago-Dorrego, C., Gómez-Gallego, F., & Castro-Piñero, J. (2023). Longitudinal effects of *FTO* gene polymorphism on body composition, cardiorespiratory fitness, physical activity, inflammatory markers, and cardiovascular risk in children and adolescents. “The UP & DOWN study.” *Scandinavian Journal of Medicine & Science in Sports*, 33(11), 2261–2272. <https://doi.org/10.1111/sms.14469>
- Mizia, S., Felińczak, A., Włodarek, D., & Syrkiewicz-Świtała, M. (2021). Evaluation of Eating Habits and Their Impact on Health among Adolescents and Young Adults: A Cross-Sectional Study. *International Journal of Environmental Research and Public Health*, 18(8), 3996. <https://doi.org/10.3390/ijerph18083996>

- Nikbakht, H.-A., Rezaianzadeh, A., Seif, M., Shojaie, L., Ghodduji Johari, M., & Ghaem, H. (2023). Physical activity and metabolic syndrome: A population base study (forest and tree model algorithms). *Clinical Nutrition ESPEN*, 56, 173–179. <https://doi.org/10.1016/j.clnesp.2023.05.014>
- Palmer, A. K., & Jensen, M. D. (2022). Metabolic changes in aging humans: Current evidence and therapeutic strategies. *Journal of Clinical Investigation*, 132(16), e158451. <https://doi.org/10.1172/JCI158451>
- Park, S., & Jee, H.-J. (2025). Association Between Physical Activity Timing and Metabolic Syndrome in Korea: A Functional Principal Component Approach. *Healthcare*, 13(12), 1384. <https://doi.org/10.3390/healthcare13121384>
- Ramírez-Gallegos, I., Marina-Arroyo, M., López-González, Á. A., Vallejos, D., Martínez-Almoyna-Rifá, E., Tárraga López, P. J., & Ramírez-Manent, J. I. (2024). Associations Between Metabolic Age, Sociodemographic Variables, and Lifestyle Factors in Spanish Workers. *Nutrients*, 16(23), 4207. <https://doi.org/10.3390/nu16234207>
- Ramírez-Gallegos, I., Tárraga López, P. J., Paublini Oliveira, H., López-González, Á. A., Martorell Sánchez, C., Martínez-Almoyna-Rifá, E., & Ramírez-Manent, J. I. (2025). Relationship Between Metabolic Age Determined by Bioimpedance and Insulin Resistance Risk Scales in Spanish Workers. *Nutrients*, 17(6), 945. <https://doi.org/10.3390/nu17060945>
- Ross, D. A., Hinton, R., Melles-Brewer, M., Engel, D., Zeck, W., Fagan, L., Herat, J., Phaladi, G., Imbago-Jácome, D., Anyona, P., Sanchez, A., Damji, N., Terki, F., Baltag, V., Patton, G., Silverman, A., Fogstad, H., Banerjee, A., & Mohan, A.

- (2020). Adolescent Well-Being: A Definition and Conceptual Framework. *Journal of Adolescent Health, 67*(4), 472–476. <https://doi.org/10.1016/j.jadohealth.2020.06.042>
- Santos, R. A. B., & Mallari, M. F. T. (2021). Relationship of sedentary behaviour and body composition of university student-athletes. *Malaysian Journal of Movement, Health & Exercise, 10*(2), 70–76. [https://doi.org/10.4103/mohe.mohe\\_26\\_21](https://doi.org/10.4103/mohe.mohe_26_21)
- Shao, Y., Wang, N., Shao, M., Liu, B., Wang, Y., Yang, Y., Li, L., & Zhong, H. (2025). The lean body mass to visceral fat mass ratio is negatively associated with cardiometabolic disorders: A cross-sectional study. *Scientific Reports, 15*(1), 3422. <https://doi.org/10.1038/s41598-025-88167-1>
- Sherwood, L. (2016). *Human physiology: From cells to systems* (9th ed). Cengage learning.
- Silverthorn, D. U., Johnson, B. R., Ober, W. C., Ober, C. E., & Silverthorn, A. C. (2016). *Human physiology: An integrated approach* (Seventh edition). Pearson.
- Simatupang, A. F., Saragi, M. R., Pinem, H. D., & Manalu, N. (2025). Metabolic Responses to Exercise Across Different Age Groups: A Literature Review. *Journal Coaching Education Sports, 6*(1), 153–158. <https://doi.org/10.31599/nz3jk132>
- Sun, Y., Yin, T., Li, M., Wang, F., Qi, J., Zhang, H., Wang, L., Zhao, J., & Zhang, Y. (2024). Development and Validation of Estimation Equations for Appendicular Skeletal Muscle Mass in Chinese Community-Dwelling Older Adults. *Clinical Interventions in Aging, Volume 19*, 265–276. <https://doi.org/10.2147/CIA.S440967>

- Syeftiani, N., Citrawati, M., Safira, L., & Kristanti, M. (2024). HUBUNGAN ANTARA AKTIVITAS FISIK DAN TINGKAT STRES DENGAN RESTING HEART RATE PADA MAHASISWA KEDOKTERAN. *Medika Kartika Jurnal Kedokteran dan Kesehatan, Volume 7 No 1*, 1–11. <https://doi.org/10.35990/mk.v7n1.p1-11>
- Trajković, N., Mitić, P. M., Barić, R., & Bogataj, Š. (2023). Editorial: Effects of physical activity on psychological well-being. *Frontiers in Psychology, 14*, 1121976. <https://doi.org/10.3389/fpsyg.2023.1121976>
- Vainshtein, A., & Sandri, M. (2020). Signaling Pathways That Control Muscle Mass. *International Journal of Molecular Sciences, 21*(13), 4759. <https://doi.org/10.3390/ijms21134759>
- Von Sömmogy, J., Rueter, J., Curbach, J., Helten, J., Tittlbach, S., & Loss, J. (2020). How Does the Campus Environment Influence Everyday Physical Activity? A Photovoice Study Among Students of Two German Universities. *Frontiers in Public Health, 8*, 561175. <https://doi.org/10.3389/fpubh.2020.561175>
- Westerterp, K. R. (2018). Exercise, energy balance and body composition. *European Journal of Clinical Nutrition, 72*(9), 1246–1250. <https://doi.org/10.1038/s41430-018-0180-4>
- Yildirim, I., Dogan, I., Isik, O., Yildirim, Y., & Karagoz, S. (2020). Investigation of the relationship between basal metabolic rate and body composition in young adults using CHAID analysis. *Progress in Nutrition, 22*(1-S), 5–10. <https://doi.org/10.23751/pn.v22i1-S.9761>

- Yusuf, K. N., Bustamam, N., Faranita, T., & Purwaningastuti, D. A. (2024). RELATIONSHIP BETWEEN PHYSICAL ACTIVITY AND SLEEP QUALITY WITH MUSCLE MASS IN FEMALE MEDICAL STUDENTS. *Jurnal Pendidikan Jasmani Dan Olahraga*, 9(1), 103–110. <https://doi.org/10.17509/jpjo.v9i1.66263>
- Zhai, Y.-J., Li, F., Lin, C.-Y., Wu, F., Qiu, H.-N., Li, J.-B., & Lin, J.-N. (2025). The mediating role of body surface area-adjusted basal metabolic rate: Effects of low muscle mass and central obesity on cognitive impairment in Chinese patients with type 2 diabetes mellitus. *Frontiers in Endocrinology*, 15, 1513035. <https://doi.org/10.3389/fendo.2024.1513035>
- Zhang, K., Ma, Y., Luo, Y., Song, Y., Xiong, G., Ma, Y., Sun, X., & Kan, C. (2023). Metabolic diseases and healthy aging: Identifying environmental and behavioral risk factors and promoting public health. *Frontiers in Public Health*, 11, 1253506. <https://doi.org/10.3389/fpubh.2023.1253506>