

---

## Title

***Correlation between inflammatory markers with physical function and body composition in community older adults: a cross-sectional study; [Correlación entre marcadores inflamatorios con función física y composición corporal en adultos mayores de la comunidad: estudio transversal]***

## Abstract

Introduction: Aging is associated with various chronic diseases that cause systemic inflammation, characterized by an increase in blood levels of interleukin 6 (IL-6) and tumor necrosis factor alpha (TNF- $\alpha$ ). Physical function and body composition may be related to these inflammatory markers in older adults. Objective: To analyze the correlation between blood inflammatory markers, physical function and body composition in community-dwelling older adults. Methodology: A cross-sectional study was carried out with 242 community-dwelling older adults (mean age was  $68\pm 6$  years for males and  $70\pm 6$  years for females; the percentage of men was 36.6% and 69.4% of women) from the city of Londrina, Brazil. Blood levels of IL-6 and TNF- $\alpha$  were analyzed with flow cytometry. For the physical evaluation, static balance was measured with the one-legged stance test (OLS), hand-grip strength (HGS) using a digital dynamometer and aerobic capacity with the six-minute walk test (6MWT). For the evaluation of body composition, the following perimeters were considered: hip, calf, quadriceps, biceps brachii, triceps brachii and waist. The correlation of inflammatory variables with those of physical function and body composition was analyzed using Pearson or Spearman with SPSS version 22 software. Results: IL-6 levels were correlated with OLS ( $r:-0.22$ ;  $p:0.002$ ), triceps circumference ( $r: 0.16$ ;  $p:0.023$ ) and waist circumference ( $r: 0.34$ ;  $p:0.000$ ). TNF- $\alpha$  levels were correlated with HGS ( $r:-0.15$ ;  $p:0.035$ ), triceps circumference ( $r: 1.79$ ;  $p:0.012$ ) and waist circumference ( $r: 0.27$ ;  $p < 0.001$ ). Conclusion: Inflammatory

---

biomarkers are related to low muscle strength, static balance, and an increase in triceps and waist circumference. © 2024 Sociedad española de dietética. All rights reserved.

## Authors

Barros Osorio C.; Sepúlveda Loyola W.; Astudillo I.; Campos J.; Valenzuela Fuenzalida J.J.; Suziane Probst V.

## Author full names

Barros Osorio, Cristián (58997183200); Sepúlveda Loyola, Walter (58289745600); Astudillo, Ignacio (58941465800); Campos, Jennifer (59005866100); Valenzuela Fuenzalida, Juan José (55365149800); Suziane Probst, Vanessa (7003939332)

## Author(s) ID

58997183200; 58289745600; 58941465800; 59005866100; 55365149800;  
7003939332

## Year

2024

## Source title

Nutricion Clinica y Dietetica Hospitalaria

---

## Volume

44.0

## Issue

2

## Page start

55

## Page end

60

## Page count

5.0

## DOI

10.12873/442barros

## Link

<https://www.scopus.com/inward/record.uri?eid=2-s2.0-85191602613&doi=10.12873%2f442barros&partnerID=40&md5=3fdfafc899355a1641f625c7c6db2135>

---

## Affiliations

Facultad de Ciencias de la Salud, Universidad Autónoma de Chile, Santiago, Chile; Facultad de la Salud y Ciencias Sociales, Universidad de las Américas, Santiago, Chile; Escuela de Kinesiología, Universidad de las Américas, Campus Santiago Centro, Chile; Departamento de Morfología, Facultad de Medicina, Universidad Andrés Bello, Santiago, 8370186, Chile; Londrina State University (UEL), University of Northern Paraná (UNOPAR), Londrina, Brazil

## Authors with affiliations

Barros Osorio C., Facultad de Ciencias de la Salud, Universidad Autónoma de Chile, Santiago, Chile; Sepúlveda Loyola W., Facultad de la Salud y Ciencias Sociales, Universidad de las Américas, Santiago, Chile, Escuela de Kinesiología, Universidad de las Américas, Campus Santiago Centro, Chile; Astudillo I., Facultad de la Salud y Ciencias Sociales, Universidad de las Américas, Santiago, Chile, Escuela de Kinesiología, Universidad de las Américas, Campus Santiago Centro, Chile; Campos J., Facultad de la Salud y Ciencias Sociales, Universidad de las Américas, Santiago, Chile, Escuela de Kinesiología, Universidad de las Américas, Campus Santiago Centro, Chile; Valenzuela Fuenzalida J.J., Departamento de Morfología, Facultad de Medicina, Universidad Andrés Bello, Santiago, 8370186, Chile; Suziane Probst V., Londrina State University (UEL), University of Northern Paraná (UNOPAR), Londrina, Brazil

## Author Keywords

Aged; Anthropometry; Inflammation; Muscle Strength; Postural Balance

---

## References

Liu Z, Liang Q, Ren Y, Guo C, Ge X, Wang L, Et al., Immunosenescence: molecular mechanisms and diseases, *Signal Transduct Target Ther*, 8, 1, (2023); Bugueno G, Badilla V., Artículo Original Diferencias sobre variables de salud mental y físico-funcionales entre hombres y mujeres del primer centro de día referencial del adulto mayor de Chile Differences on mental and physical-functional health variables between men and women of the first referential day center of the older adult of Chile, *Nutr clín diet hosp*, 40, 2, pp. 159-164, (2020); Franceschi C, Garagnani P, Parini P, Giuliani C, Santoro A., Inflammaging: a new immune-metabolic viewpoint for age-related diseases, *Nat Rev Endocrinol*, 14, 10, pp. 576-590, (2018); Mukai K, Tsai M, Saito H, Galli SJ., Mast cells as sources of cytokines, chemokines, and growth factors, *Immunol Rev*, 282, 1, pp. 121-150, (2018); Chung HY, Kim DH, Lee EK, Chung KW, Chung S, Lee B, Et al., Redefining Chronic Inflammation in Aging and Age-Related Diseases: Proposal of the Senoinflammation Concept, *Aging Dis*, 10, 2, (2019); Pothier K, Gana W, Bailly N, Fougere B., Associations Between Frailty and Inflammation, Physical, and Psycho-Social Health in Older Adults: A Systematic Review, *Front Psychol*, 13, (2022); Furman D, Campisi J, Verdin E, Carrera-Bastos P, Targ S, Franceschi C, Et al., Chronic inflammation in the etiology of disease across the life span, *Nat Med*, 25, 12, pp. 1822-1832, (2019); Sadjapong U, Yodkeeree S, Sungkarat S, Siviroj P., Multicomponent Exercise Program Reduces Frailty and Inflammatory Biomarkers and Improves Physical Performance in Community-Dwelling Older Adults: A Randomized Controlled Trial, *Int J Environ Res Public Health*, 17, 11, (2020); El-Mikkawy DME, EL-Sadek MA, EL-Badawy MA, Samaha D., Circulating level of interleukin-6 in relation to body mass indices and lipid profile in Egyptian adults with overweight and obesity, *Egyptian Rheumatology and Rehabilitation*, 47, 1, (2020); Reyna-Quinonez D, Morejon-Iza L, Arteaga-Pazmino CL., *Nutrición clínica y dietética*

---

hospitalaria, *Nutrición Clínica y Dietética Hospitalaria* [Internet], 43, 3, (2020); Malta M, Cardoso LO, Bastos FI, Magnanini MMF, da Silva CMFP., STROBE initiative: guidelines on reporting observational studies, *Rev Saude Publica*, 44, 3, pp. 559-565, (2010); Sepulveda Loyola WA, Vilaca Cavallari Machado F, Araujo de Castro L, Hissnauer Leal Baltus T, Rampazzo Morelli N, Landucci Bonifacio K, Et al., Is oxidative stress associated with disease severity, pulmonary function and metabolic syndrome in chronic obstructive pulmonary disease?, *Revista Clínica Española (English Edition)*, 219, 9, pp. 477-484, (2019); Sanchez-Garcia S, Garcia-Pena C, Duque-Lopez MX, Juarez-Cedillo T, Cortes-Nunez AR, Reyes-Beaman S., Anthropometric measures and nutritional status in a healthy elderly population, *BMC Public Health*, 7, 1, (2007); Britto RR, Probst VS, Andrade AFD, Samora GAR, Hernandez NA, Marinho PEM, Et al., Reference equations for the six-minute walk distance based on a Brazilian multicenter study, *Braz J Phys Ther*, 17, 6, pp. 556-563, (2013); Khanal P, He L, Stebbings GK, Onambele-Pearson GL, Degens H, Williams AG, Et al., Static one-leg standing balance test as a screening tool for low muscle mass in healthy elderly women, *Aging Clin Exp Res*, 33, 7, pp. 1831-1839, (2021); Pereira DS, Mateo ECC, de Queiroz BZ, Assumpcao AM, Miranda AS, Felicio DC, Et al., TNF- $\alpha$ , IL6, and IL10 polymorphisms and the effect of physical exercise on inflammatory parameters and physical performance in elderly women, *Age (Omaha)*, 35, 6, pp. 2455-2463, (2013); Ribeiro JC, Duarte JG, Gomes GAO, Costa-Guarisco LP, de Jesus ITM, Nascimento CMC, Et al., Associations between inflammatory markers and muscle strength in older adults according to the presence or absence of obesity, *Exp Gerontol*, 151, (2021); Bartlett DB, Firth CM, Phillips AC, Moss P, Baylis D, Syddall H, Et al., The age-related increase in low-grade systemic inflammation (Inflammaging) is not driven by cytomegalovirus infection, *Aging Cell*, 11, 5, pp. 912-915, (2012); Marcos-Perez D, Sanchez-Flores M, Maseda A, Lorenzo-Lopez L, Millan-Calenti JC, Gostner JM, Et al., Frailty in Older Adults Is Associated With Plasma Concentrations of Inflammatory Mediators but Not With

---

Lymphocyte Subpopulations, *Front Immunol*, 9, (2018); Zille de Queiroz B, de Britto Rosa NM, Pereira DS, Lopes RA, Leopoldino AAO, Thomasini RL, Et al., Inflammatory mediators and the risk of falls among older women with acute low back pain: data from Back Complaints in the Elders (BACE)-Brazil, *European Spine Journal*, 29, 3, pp. 549-555, (2020); Sepulveda Loyola W, de Barros Morselli J, Araya Quintanilla F, Teixeira D, Alvarez Bustos A, Molari M, Et al., Clinical impact of osteosarcopenia on mortality, physical function and chronic inflammation: a 9-year follow up cohort study, *Nutricion Clinica y Dietetica Hospitalaria [Internet]*, 43, 4, pp. 133-140, (2023); Wu D, Gao X, Shi Y, Wang H, Wang W, Li Y, Et al., Association between Handgrip Strength and the Systemic Immune-Inflammation Index: A Nationwide Study, NHANES 2011-2014, *Int J Environ Res Public Health*, 19, 20, (2022); De Larichaudy J, Zufferli A, Serra F, Isidori AM, Naro F, Dessalle K, Et al., TNF- $\alpha$ - and tumor-induced skeletal muscle atrophy involves sphingolipid metabolism, *Skelet Muscle*, 2, 1, (2012); Zuo Prather, Stetskiv Garrison, Meade Peace, Et al., Inflammaging and Oxidative Stress in Human Diseases: From Molecular Mechanisms to Novel Treatments, *Int J Mol Sci*, 20, 18, (2019); Tuttle CSL, Thang LAN, Maier AB., Markers of inflammation and their association with muscle strength and mass: A systematic review and meta-analysis, *Ageing Res Rev*, 64, (2020); Lee SY., Handgrip Strength: An Irreplaceable Indicator of Muscle Function, *Ann Rehabil Med*, 45, 3, pp. 167-169, (2021); Mella De Cuevas KM, Sepulveda-Loyola W, Araya-Quintanilla F, de Barros Morselli J, Molari M, Probst VS., Association between clinical measures for the diagnosis of osteosarcopenia with functionality and mortality in older adults: longitudinal study, *Nutricion Clinica y Dietetica Hospitalaria*, 42, 3, pp. 143-151, (2022); Smith L, Yang L, Hamer M., Handgrip strength, inflammatory markers, and mortality, *Scand J Med Sci Sports*, 29, 8, pp. 1190-1196, (2019); Mella De Cuevas KM, Sepulveda-Loyola W, Araya-Quintanilla F, de Barros Morselli J, Molari M, Probst VS., Association between clinical measures for the diagnosis of osteosarcopenia with functionality and mortality in older adults: longitudinal study, *Nutricion Clinica y*

---

Dietetica Hospitalaria, 42, 3, pp. 143-151, (2022); Al-Mansoori L, Al-Jaber H, Prince MS, Elrayess MA., Role of Inflammatory Cytokines, Growth Factors and Adipokines in Adipogenesis and Insulin Resistance, Inflammation, 45, 1, pp. 31-44, (2022); Vargas Vitoria R, Alfaro Larena J, Rodriguez M, Arellano R, Valdes Badilla P., Efectos de un programa multicomponente sobre medidas antropométricas, condición física y calidad de vida relacionada con la salud en personas mayores, Nutricion Clinica y Dietetica Hospitalaria, 41, 1, pp. 69-75, (2021); Tay J, Goss AM, Locher JL, Ard JD, Gower BA., Physical Function and Strength in Relation to Inflammation in Older Adults with Obesity and Increased Cardiometabolic Risk, J Nutr Health Aging, 23, 10, pp. 949-957, (2019); Cawthorn WP, Sethi JK., TNF- $\alpha$  and adipocyte biology, FEBS Lett, 582, 1, pp. 117-131, (2008); Calvani R, Marini F, Cesari M, Buford TW, Manini TM, Pahor M, Et al., Systemic inflammation, body composition, and physical performance in old community-dwellers, J Cachexia Sarcopenia Muscle, 8, 1, pp. 69-77, (2017); Tay J, Goss AM, Locher JL, Ard JD, Gower BA., Physical Function and Strength in Relation to Inflammation in Older Adults with Obesity and Increased Cardiometabolic Risk, J Nutr Health Aging, 23, 10, pp. 949-957, (2019); Cesari M, Fielding RA, Pahor M, Goodpaster B, Hellerstein M, Van Kan GA, Et al., Biomarkers of sarcopenia in clinical trials-recommendations from the International Working Group on Sarcopenia, J Cachexia Sarcopenia Muscle, 3, 3, pp. 181-190, (2012); Menzel A, Samouda H, Dohet F, Loap S, Ellulu MS, Bohn T., Common and Novel Markers for Measuring Inflammation and Oxidative Stress Ex Vivo in Research and Clinical Practice-Which to Use Regarding Disease Outcomes?, Antioxidants, 10, 3, (2021)

## Correspondence Address

W. Sepúlveda Loyola; Facultad de la Salud y Ciencias Sociales, Universidad de las Américas, Santiago, Chile; email: wsepulveda@udla.cl



---

## **Publisher**

Sociedad española de dietética

## **ISSN**

02116057

## **CODEN**

NUTCD

## **Language of Original Document**

Spanish

## **Abbreviated Source Title**

Nutr. Clin. Diet. Hosp.

## **Document Type**

Article

## **Publication Stage**

Final

---

## Source

Scopus

## EID

2-s2.0-85191602613