

INTISARI

PENGARUH SUPLEMENTASI TRIPTOFAN DAN SENAM OTAK TERHADAP FUNGSI FISIK PADA LANSIA: KAJIAN TERHADAP KADAR IL-6, TNF- α , DAN BDNF PADA PLASMA

Latar belakang: Penuaan menyebabkan penurunan fungsi fisik yang berdampak langsung pada kemandirian dan kualitas hidup lansia. Penuaan berkaitan dengan peningkatan Interleukin-6 (IL-6) dan *Tumor necrosis factor-alpha* (TNF- α), serta penurunan *Brain-derived neurotrophic factor* (BDNF). Faktor psikososial pada lansia seperti stres kronis turut memperburuk inflamasi dan penurunan fungsi fisik. Suplementasi triptofan dari pisang berpotensi menurunkan inflamasi dan membantu regenerasi otot, sedangkan senam otak berpotensi meningkatkan BDNF dan memperbaiki fungsi neuromuskuler. Namun, bukti mengenai efek kombinasi kedua intervensi tersebut terhadap fungsi fisik lansia Indonesia masih terbatas.

Tujuan: Mengkaji pengaruh kombinasi suplementasi triptofan dari pisang dan senam otak terhadap fungsi fisik (*handgrip strength* dan *Timed Up and Go* (TUG) *test*) pada lansia dengan mengkaji IL-6, TNF- α dan BDNF pada plasma.

Metode: Penelitian *quasi-experimental one-group pretest-posttest* dengan *internal reference group*. Sampel adalah 14 subjek berusia ≥ 60 tahun di Panti Budi Dharma Yogyakarta. Pengambilan sampel darah untuk pemeriksaan ELISA kadar IL-6, TNF- α , dan BDNF serta pemeriksaan *handgrip strength* dan TUG dilakukan pada minggu ke-0 (*pre*) dan minggu ke-12 (*post*). Intervensi dilakukan selama 12 minggu.

Hasil: Karakteristik dasar subjek homogen. Perubahan IL-6 tidak signifikan dengan kecenderungan menurun secara umum ($p = 0,203$; $r = 0,400$). Terdapat penurunan TNF- α yang signifikan pada sampel total ($p = 0,028$) dan pada perempuan ($p = 0,043$), tetapi tidak pada laki-laki ($p = 0,273$; $r = 0,548$). Tidak terdapat perubahan BDNF yang bermakna. Namun, terdapat kecenderungan peningkatan BDNF pada sampel total ($p = 0,813$; $d = 0,077$) dan pada laki-laki ($p = 0,317$; $r = -0,599$), sedangkan pada perempuan cenderung menurun ($p = 0,691$; $r = 0,172$). Tidak terdapat perubahan bermakna hasil *handgrip strength*. *Handgrip strength* cenderung menurun secara umum ($p = 0,203$; $d = 0,400$) dan pada laki-laki ($p = 0,208$; $d = 0,658$), sedangkan pada perempuan cenderung meningkat ($p = 0,791$; $d = -0,114$). Terdapat perbaikan signifikan hasil TUG secara umum ($p = 0,005$) dan pada perempuan ($p = 0,028$). Perubahan TUG pada laki-laki tidak bermakna dengan kecenderungan perbaikan ($p = 0,068$; $r = 0,913$). Tidak ditemukan korelasi antara perubahan penanda biologis dan fungsi fisik.

Kesimpulan: Intervensi berhubungan dengan penurunan TNF- α dan perbaikan hasil TUG, terutama pada perempuan. Namun, intervensi ini belum menunjukkan pengaruh bermakna terhadap IL-6, BDNF, maupun *handgrip strength*.

Kata kunci: Lansia, fungsi fisik, triptofan, senam otak.

ABSTRACT

THE EFFECTS OF TRYPTOPHAN SUPPLEMENTATION AND BRAIN GYM ON PHYSICAL FUNCTION IN THE ELDERLY: A STUDY ON IL-6, TNF-A, AND BDNF PLASMA LEVELS

Background: Aging leads to a decline in physical function, which directly affects autonomy and quality of life in older adults. Aging is associated with increased Interleukin-6 (IL-6) and Tumor necrosis factor-alpha (TNF- α), as well as decreased Brain-derived neurotrophic factor (BDNF). Tryptophan supplementation derived from bananas has the potential to reduce inflammation and improve muscle regeneration, while brain gym may increase BDNF and improve neuromuscular function. However, evidence regarding the combined effects of these interventions on physical function among Indonesian elderly remains limited.

Objective: To evaluate the effects of combined banana-derived tryptophan supplementation and brain gym on physical function (handgrip strength and Timed Up and Go (TUG) test) in the elderly by examining plasma IL-6 and TNF- α and BDNF.

Methods: This study employed a quasi-experimental one-group pretest–posttest design with an internal reference group. The sample consisted of 14 participants aged ≥ 60 years residing at Panti Budi Dharma, Yogyakarta. Blood sampling for ELISA-based measurement as well as assessment of handgrip strength and TUG were conducted at week 0 (pre) and week 12 (post). The intervention was implemented for 12 weeks.

Results: Baseline characteristics of the participants were homogeneous. Changes in IL-6 were not statistically significant, although a general downward trend was observed ($p = 0,203$; $r = 0,400$). A significant reduction in TNF- α was found in the total sample ($p = 0,028$) and among female participants ($p = 0,043$), but not among males ($p = 0,273$; $r = 0,548$). No significant changes in BDNF levels were observed. However, BDNF showed a tendency to increase in the total sample ($p = 0,813$; $d = 0,077$) and among males ($p = 0,317$; $r = -0,599$), while a decreasing trend was observed among females ($p = 0,691$; $r = 0,172$). No significant changes were observed in handgrip strength. Handgrip strength tended to decrease in the total sample ($p = 0,203$; $d = 0,400$) and among males ($p = 0,208$; $d = 0,658$), whereas a slight increasing trend was observed among females ($p = 0,791$; $d = -0,114$). In contrast, a significant improvement in TUG performance was observed in the total sample ($p = 0,005$) and among females ($p = 0,028$). Changes in TUG performance among males were not statistically significant but showed a trend toward improvement ($p = 0,068$; $r = 0,913$). There were no correlations between changes in biological markers and physical function.

Conclusion: The intervention was associated with reduced TNF- α levels and improved TUG results, particularly among female older adults. However, no significant effects were observed on IL-6, BDNF, or handgrip strength.

Keywords: Older adults; physical function; tryptophan; brain gym.