

**EFEK LATIHAN AEROBIK TERHADAP KADAR
BRAIN-DERIVED NEUROTROPHIC FACTOR (BDNF) SERUM PADA
SUBJEK STROKE DENGAN GANGGUAN FUNGSI KOGNITIF**

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ABSTRAK

Objektif: Stroke merupakan penyebab kecacatan dan kematian utama di Indonesia yang memiliki komplikasi tersering berupa gangguan kognitif. Latihan aerobik bertujuan menghambat penurunan fungsi kognitif serta meningkatkan performa kognitif pasca stroke melalui mekanisme neuroplastisitas yang mempengaruhi *long term potentiation* (LTP) pada hipokampus. Tujuan penelitian ini adalah meneliti efek latihan aerobik terhadap kadar *brain-derived neurotrophic factor* (BDNF) serum pada subjek stroke dengan gangguan fungsi kognitif.

Metode: Studi eksperimental *pre and post test* pada subjek laki-laki dan perempuan dengan stroke fase sub akut berjumlah 12 orang untuk masing-masing kelompok. Kelompok perlakuan memperoleh program latihan aerobik dengan sepeda statis dan terapi standar, sedangkan kelompok kontrol memperoleh terapi standar 30 menit/sesi 3x/minggu, selama 6 minggu. Parameter yang dinilai adalah kadar BDNF serum.

Hasil: Tidak didapatkan adanya perbedaan yang signifikan antara kadar BDNF serum pada kelompok kontrol maupun perlakuan ($p = 0,214$), walaupun terdapat peningkatan signifikan kadar BDNF serum pada kelompok perlakuan ($p = 0,0002$) dengan rerata sebelum perlakuan sebesar $81,963 \pm 60,691$ pg/ml dan rerata setelah perlakuan sebesar $280,981 \pm 73,534$ pg/ml. Serupa dengan kelompok perlakuan, , didapatkan peningkatan signifikan kadar BDNF serum ($p = 0,0003$) pada kelompok kontrol, dengan rerata sebelum perlakuan sebesar $136,388 \pm 76,319$ pg/ml dan rerata setelah perlakuan sebesar $246,027 \pm 40,807$ pg/ml.

Kesimpulan: Studi ini menunjukkan tidak adanya perbedaan yang signifikan kadar BDNF serum pada kelompok yang memperoleh latihan aerobik dan terapi standar 3x/minggu selama 6 minggu, bila dibandingkan dengan kelompok kontrol yang hanya memperoleh mendapatkan terapi standar, namun pada masing-masing kelompok didapatkan peningkatan yang signifikan sebelum dan sesudah perlakuan.

Kata Kunci: Latihan aerobik, sepeda statis, kadar *brain-derived neurotrophic factor* (BDNF) serum, stroke, gangguan fungsi kognitif.

**EFFECT OF AEROBIC EXERCISE ON
SERUM *BRAIN-DERIVED NEUROTROPHIC FACTOR* (BDNF)
LEVEL IN STROKE SUBJECTS WITH
COGNITIVE FUNCTION IMPAIRMENT**

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ABSTRACT

Objective: Stroke is one of the most disabling disease and the leading cause of death in Indonesia which has the most frequent complications in the form of cognitive impairment. Aerobic exercise aims to inhibit cognitive decline and improve cognitive performance after stroke through neuroplasticity mechanisms that affect long term potentiation (LTP) in the hippocampus. The purpose of this study was to examine the effect of aerobic exercise on serum brain-derived neurotrophic factor (BDNF) levels in stroke subjects with cognitive impairment.

Methods: Pre and post test experimental studies on male and female subjects with sub acute phase stroke totaling 12 people for each group. The treatment group received an aerobic exercise program with a static cycle with standard therapy. The control group received standard therapy 30 minutes/session, 3x/week, for 6 weeks. The parameter assessed was serum brain-derived neurotrophic factor (BDNF) levels.

Results: No significant difference ($p = 0,214$) in BDNF serum level in both control ($246,027 \pm 40,807$ pg/ml) and treatment groups ($280,981 \pm 73,534$ pg/ml) after given intervention. Although there was a significant increase in serum BDNF levels in the treatment group ($p = 0.0002$) with a mean before treatment of $81,963 \pm 60,691$ pg / ml and mean after treatment of $280,981 \pm 73,534$ pg / ml. Similar to the treatment group, there was a significant increase in serum BDNF levels ($p = 0,0003$) in control group, with a mean before treatment of $136,388 \pm 76,319$ ppg / ml and mean after treatment of $246,027 \pm 40,807$ pg / ml .

Conclusion: This study showed no significant difference in serum BDNF levels after being given an aerobic exercise program with a static cycle and standard therapy 3x/week for 6 weeks, when compared to the control group that only received standard therapy, although both control and treatment groups showed significant difference before and after the intervention.

Keywords: Aerobic exercise, static cycle, *brain-derived neurotrophic factor* (BDNF) serum level, stroke, cognitive function impairment.