

## ABSTRAK

Pola perubahan kadar serum *Nerve Growth Factor (NGF)*, *Brain-Derived Neurotrophic Factor (BDNF)*, dan *Neurotrophin-3 (NT-3)* pada perbaikan neuropati diabetik setelah melakukan senam kaki diabetik

Tri Wahyuliati

**Tujuan :** menjelaskan pola perubahan kadar serum NGF, BDNF, dan NT-3 pada perbaikan neuropati diabetik setelah melakukan senam kaki diabetik.

**Metode :** penelitian ini merupakan *true experimental study* dengan metode *randomized pre test – post test control group design*. Sebanyak 36 subyek terbagi ke dalam kelompok senam atau kontrol secara *systematic random sampling*. Pada akhir penelitian terjadi *drop out* pada kelompok senam sebanyak 3 subyek dan pada kelompok kontrol 1 subyek

**Hasil :** pada kelompok senam terjadi perbaikan bermakna pada skor ABI ( $p.0.002$ ), tensi sistolik ( $p.0.014$ ), tensi diastolik ( $p.0.055$ ), skor DNS ( $p.0.01$ ), DNE ( $p.0.001$ ), peningkatan kadar serum NGF ( $p.0.157$ ), penurunan kadar serum BDNF ( $p.0.059$ ), dan peningkatan kadar serum NT-3 ( $p.0.049$ ). Pada kelompok kontrol hasil tersebut secara berturut – turut adalah ABI ( $p.0.131$ ), tensi sistolik ( $p.0.668$ ), tensi diastolik ( $p.0.216$ ), DNS ( $p.1.00$ ), DNE ( $p.0.543$ ), peningkatan kadar serum NGF ( $p.0.402$ ), penurunan BDNF ( $p.0.803$ ), dan peningkatan NT-3 ( $p.264$ ). Perbandingan hasil pada kedua kelompok adalah berbeda bermakna pada perbaikan skor ABI ( $p.0.01$ ), tensi sistolik ( $p.0.01$ ), tensi diastolik ( $p.0.01$ ), DNS ( $p.0.01$ ), DNE ( $p.0.01$ ), peningkatan kadar serum NGF ( $p.0.04$ ), penurunan BDNF ( $p.0.01$ ), dan peningkatan NT-3 ( $p.0.01$ ).

**Simpulan :** Senam kaki diabetik memiliki pengaruh perifer terhadap perbaikan bermakna secara klinis berdasarkan skor ABI, tensi sistolik dan diastolik, DNS dan DNE. Peningkatan bermakna kadar serum NGF, penurunan bermakna kadar serum BDNF sebagai kompensasi reduksi dari pengaruh kerja perifer senam kaki. NT-3 merupakan *neurotrophin* yang kadarnya paling terpengaruh meningkat dibandingkan NGF dan BDNF.

**Kata kunci :** *nerve growth factor*, *brain-derived neurotrophic factor*, *neurotrophin3*, senam kaki, serum, manusia, neuropati, diabetes.

## ABSTRACT

### PATTERNS OF CHANGES IN SERUM LEVELS OF NERVE GROWTH FACTOR, BRAIN-DERIVED NEUROTROPHIC FACTOR, AND NEUROTROPHIN-3 TOWARD THE REPAIR OF DIABETIC NEUROPATHY, AFTER PERFORMING DIABETIC FOOT EXERCISE

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**Objective :** to determine the pattern of changes in serum levels of NGF, BDNF, and NT-3 in the improvement of diabetic neuropathy, after doing diabetic foot exercise.

**Method :** a true experimental study with randomized pre test – post test control group design. A total of 36 subjects meeting the inclusion and exclusion criteria were included in the exercise group or the control one with age matched systematic random sampling method. The exercise group has 3 subjects dropped out, and the control group has 1 subject dropped out.

**Result :** Exercise group shows significant improvement on the score of ABI ( $p.0.002$ ), systolic blood pressure ( $p.0.014$ ), diastolic blood pressure ( $p.0.055$ ), DNS ( $p.0.01$ ), DNE ( $p.0.001$ ). Increase of serum level of NGF ( $p.0.157$ ), decrease of serum level of BDNF ( $p.0.059$ ), and increase of serum level of NT-3 ( $p.0.049$ ). Control group has a result respectively on ABI ( $p.0.131$ ), systolic blood pressure ( $p.0.668$ ), diastolic blood pressure ( $p.0.216$ ), DNS ( $p.1.00$ ), DNE ( $p.0.543$ ), increase of NGF ( $p.0.402$ ), decrease of BDNF ( $p.0.803$ ), and increase of NT-3 ( $p.0.264$ ). The comparison results of the two groups have significant different on the score of ABI ( $p.0.01$ ), systolic blood pressure ( $p.0.01$ ), diastolic blood pressure ( $p.0.01$ ), DNS ( $p.0.01$ ), DNE ( $p.0.01$ ), increase of NGF ( $p.0.04$ ), decrease of BDNF ( $p.0.01$ ), and increase of NT-3 ( $p.0.01$ ).

**Conclusion :** Diabetic foot exercise has a peripheral affect on a clinically significant improvement based on ABI scores, systolic and diastolic blood pressure, DNS and DNE. A significant increase in serum levels of NGF, a significant decrease in BDNF serum levels is as reductive compensation from the influence of peripheral foot exercise work. The most affected Neurotrophin level is NT-3 which is more increased being compared to NGF and BDNF.

**Key words:** *nerve growth factor, brain-derived neurotrophic factor, neurotrophin-3, foot, exercise, serum, human, neuropathy, diabetes.*