ABSTRAK

Efek Latihan *Treadmill* Intensitas Sedang Dengan Peningkatan Kecepatan Dan Inklinasi Bertahap Terhadap Fungsi Sel β Pankreas Melalui Peran Vitamin D Pada Penderita Diabetes Mellitus Tipe 2

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Latar belakang: Vitamin D merupakan senyawa lipofilik yang dapat terperangkap dalam jaringan adiposa dan sering didapatkan pada individu dengan sindroma metabolik, termasuk diabetes mellitus tipe 2. Vitamin D diketahui memiliki peran sebagai regulator potensial pada toleransi glukosa melalui efeknya pada sekresi insulin dan sensitivitas insulin. Latihan fisik merupakan stimulus kuat untuk mobilisasi lipid dari jaringan adiposa sehingga dapat meningkatkan serum vitamin D yang bersirkulasi. Penelitian mengenai efek latihan *treadmill* terhadap peningkatan kadar vitamin D sehingga dapat memperbaiki fungsi sel β pankreas belum pernah dilakukan.

Tujuan: Menganalisis efek latihan *treadmill* intensitas sedang dengan peningkatan kecepatan dan inklinasi bertahap terhadap fungsi sel β pankreas melalui peran vitamin D pada penderita DM tipe 2

Metode: Penelitian ini merupakan penelitian *randomized control trial* pada pasien DM tipe 2 di poli endokrin RSUD Dr. Soetomo Surabaya yang memenuhi kriteria eligibilitas. Subyek dibagi menjadi 2 kelompok, yakni kelompok perlakuan (P) dan kontrol (K). Dilakukan pemeriksaan kadar insulin, gula darah puasa dan 25(OH)D serta perhitungan HOMA B pada saat sebelum dan setelah program latihan *treadmill* selama 4 minggu

Hasil: Dua puluh subyek yang dapat mengikuti hingga akhir penelitian dianalisis dari 22 subjek penelitian. Didapatkan perbedaan bermakna kadar vitamin D sebelum dan setelah latihan *treadmill* pada kelompok P (p = 0,041) sedangkan pada kelompok K tidak didapatkan perbedaan bermakna (p = 0,355). Didapatkan perbedaan bermakna fungsi sel β pankreas sebelum dan setelah latihan *treadmill* pada kedua kelompok yakni kelompok P (p = 0,013) dan pada kelompok K (p = 0,032). Tidak didapatkan korelasi bermakna antara kadar vitamin D dengan fungsi sel β pankreas setelah latihan *treadmill* pada kedua kelompok yakni kelompok P (p = 0,446, r_s = 0.273) dan kelompok K (p = 0,174, r_s = - 0,467)

Kesimpulan: latihan *treadmill* intensitas sedang dengan peningkatan kecepatan dan inklinasi bertahap dapat meningkatkan kadar vitamin D dan fungsi sel β pankreas. Peningkatan fungsi sel β pankreas tidak hanya melalui peran vitamin D

Kata kunci: *treadmill,* vitamin D, fungsi sel β pankreas, diabetes mellitus tipe 2

ABSTRACT

Effects of Moderate Intensity Treadmill Exercises with Increased Speed and Gradual Inclination on Pancreatic β Cell Function Through the Role of Vitamin D in Patients with Type 2 Diabetes Mellitus

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Background: *Vitamin D is a lipophilic compound that can be trapped in adipose tissue that's often obtained in metabolic syndrome, including type 2 diabetes. Vitamin D may play a functional role in glucose tolerance through its effects on insulin secretion and insulin sensitivity. Physical exercise is a powerful stimulus for mobilizing lipids from adipose tissue so that it can increase circulating vitamin D serum. The study that evaluates the effects of treadmill exercise on increasing vitamin D levels so that it can improve pancreatic β cell function has never been done*

Objective: *To analyze the effect of moderate-intensity treadmill exercise with increased speed and gradual inclination of pancreatic β cell function through the role of vitamin D in patients with type 2 diabetes*

Method*: This randomized control trial was conducted in Dr. Soetomo General Academic Hospital. 22 patients with T2DM were divided into 2 groups; exercise and control group. Participants were assessed for clinical and biochemistry. Serum insulin, fasting blood glucose, and 25(OH)D concentration, and HOMA B was calculated. All measurements were performed at the beginning and after 4 weeks of training*

Results: *20 participants took part in the study. We found that vitamin D levels before and after the treadmill in the exercise group were significantly increased (p = 0.041) but not in the control group (p = 0.355). A significant improvement that was observed in the homeostatic model assessment of β cell function (HOMA-β) were both significantly ameliorated (p = 0.013 and p = 0.032, respectively). There was no significant correlation was found between vitamin D levels and pancreatic β cell function after treadmill exercise in both groups (exercise group p = 0.446, rs = 0.273; control group p = 0.174, rs = - 0.467)*

Conclusion: *Moderate intensity treadmill exercises with increased speed and gradual inclination can increase vitamin D levels and pancreatic β cell function. Enhancement of pancreatic β cell function not only through the role of vitamin D*

Keywords: *treadmill, vitamin D, pancreatic β cell function, type 2 diabetes mellitus*