

## ABSTRAK

**Efek Latihan *Treadmill* Intensitas Sedang dengan Peningkatan Kecepatan dan Inklinasi Bertahap terhadap Resistensi Insulin Melalui Peran Vitamin D pada Penderita Diabetes Melitus Tipe 2**

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**Latar belakang:** Vitamin D merupakan suatu hormon steroid yang bersifat lipofilik yang saat ini dikaitkan dengan patogenesis terjadinya diabetes melitus tipe 2 beserta komplikasinya. Hal ini dikarenakan vitamin D mempunyai efek terhadap sekresi insulin dan aksi dari insulin sehingga dapat memperbaiki fungsi dari sel beta pankreas dan resistensi insulin. Latihan fisik diketahui dapat meningkatkan kadar vitamin D serum dengan meningkatkan proses lipolisis. Selain itu latihan fisik juga dapat memperbaiki resistensi insulin melalui beberapa jalur. Penelitian mengenai efek *treadmill* terhadap resistensi insulin melalui peran vitamin D masih belum banyak dilakukan.

**Tujuan:** Menganalisis efek latihan *treadmill* intensitas sedang dengan peningkatan kecepatan dan inklinasi bertahap terhadap resistensi insulin melalui peran vitamin D pada pasien diabetes melitus tipe 2

**Metode:** penelitian ini merupakan penelitian analitik observasional dengan desain quasi eksperimental menggunakan data sekunder pasien diabetes melitus tipe 2 yang berkunjung ke poli endokrin RSUD Dr. Soetomo Surabaya yang memenuhi kriteria inklusi dan eksklusi. Subjek penelitian dibagi menjadi 2 kelompok, yaitu kelompok perlakuan yang mendapatkan latihan *treadmill* intensitas sedang dengan peningkatan kecepatan dan inklinasi bertahap 3x/minggu selama 4 minggu dan kelompok kontrol. Subjek penelitian dilakukan pemeriksaan kadar vitamin D dan HOMA-IR pada awal dan akhir program.

**Hasil:** Didapatkan perbedaan bermakna kadar vitamin D sebelum dan sesudah latihan *treadmill* pada kelompok perlakuan ( $p=0,041$ ). Tidak terdapat perbedaan kadar HOMA-IR sebelum dan sesudah latihan *treadmill* pada kelompok perlakuan ( $p=0,165$ ) dan kelompok kontrol ( $p=0,41$ ). Tidak terdapat korelasi antara kadar vitamin D dengan resistensi insulin setelah latihan *treadmill* baik pada kelompok kontrol ( $p=0,174$ ) dan kelompok perlakuan ( $0,77$ ). Hal ini dapat disebabkan karena durasi latihan yang pendek, adanya variabel perancu yang tidak dapat dikendalikan seperti diet, aktivitas fisik lain diluar program, paparan sinar matahari dan riwayat genetic, adanya penggunaan insulin dan obat antidiabetik.

**Kesimpulan:** Latihan *treadmill* intensitas sedang dapat meningkatkan kadar vitamin D. Latihan *treadmill* intensitas sedang selama 4 minggu belum memperbaiki resistensi insulin. Perbaikan resistensi insulin dipengaruhi oleh beberapa faktor.

**Kata Kunci:** resistensi insulin, vitamin D, *treadmill*, diabetes melitus

## ABSTRACT

***Effects of Moderate Intensity Treadmill Workout with Increased Speed and the Gradual Inclination of Insulin Resistance through the Role of Vitamin D Patients with Type 2 Diabetes Melitus***

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**Background:** Vitamin D is a lipophilic steroid hormone which is currently associated with the pathogenesis of type 2 diabetes mellitus and its complications. This is because vitamin D has an effect on insulin secretion and the action of insulin, so that it can improve the function of pancreatic beta cells and insulin resistance. Physical exercise is known to increase serum vitamin D levels by increasing the lipolysis process. Physical exercise can also improve insulin resistance in several ways. Research on the effects of treadmills on insulin resistance through the role of vitamin D has not been widely conducted

**Objective:** To analyze the effect of moderate-intensity treadmill exercise with increasing speed and gradual inclination of insulin resistance through the role of vitamin D in patients with type 2 diabetes melitus.

**Methods:** This study was an experimental analytical study with a quasi-experimental design using secondary data for patients with type 2 diabetes melitus who visited the endocrine clinic at RSUD Dr. Soetomo Surabaya which met the inclusion and exclusion criteria. The research subjects were divided into 2 groups, namely the treatment group who received moderate-intensity treadmill training with increased speed and inclination gradually 3x / week for 4 weeks, and the control group. The subjects of the study were to check their levels of vitamin D and HOMA-IR at the beginning and end of the program.

**Results:** It was found that there were significant differences in vitamin D levels before and after treadmill exercise in the treatment group ( $p = 0.041$ ). There was no difference in levels of HOMA-IR before and after treadmill training in the treatment group ( $p = 0.165$ ) and the control group ( $p = 0.41$ ). There was no correlation between vitamin D levels and insulin resistance after treadmill exercise in both the control group ( $p = 0.174$ ) and the treatment group ( $0.77$ ). This can be due to the duration of 4 weeks of exercise, confounding variables that cannot be controlled such as diet, other physical activity outside the program, sun exposure, and genetic history.

**Conclusion:** Moderate intensity treadmill exercise can increase vitamin D levels. Moderate treadmill exercise for 4 weeks has not improved insulin resistance. Improvement of insulin resistance is influenced by several factors.

**Keywords:** insulin resistance, vitamin D, treadmill, diabetes melitus