

RINGKASAN

Membandingkan Latihan fisik Intensitas Sedang kontinyu dan Interval terhadap perubahan Kadar glukosa Darah pada Penderita Diabetes Mellitus

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Diabetes merupakan masalah kesehatan dunia dengan angka kejadian yang tinggi pada dekade terakhir. Pada tahun 1990 di Amerika prevalensi diabetes yang terdiagnosis pada penduduk usia 20 – 74 tahun adalah 4,9% dan meningkat menjadi 6,5% pada tahun 1998.) Laporan International Diabetes Federation (IDF) tahun 2003 menunjukkan jumlah pasien Diabetes di dunia telah meningkat, dan biaya pengelolaannya menjadi 3 kali lipat. Global Diabetes Statistik memperkirakan pada tahun 2003 terdapat 333 juta orang mengalami penyakit diabetes dan perkiraan pada tahun yang sama di Indonesia akan mencapai 19,4 juta orang. Sampai dengan tahun 2025. prevalensi penyakit diabetes di Indonesia diperkirakan sebanyak 12 – 23 % dari penduduk berusia diatas 15 tahun. Angka tersebut cenderung meningkat seiring dengan tingkat pertumbuhan ekonomi. Tujuan penelitian ini adalah untuk membuktikan bahwa latihan intensitas sedang interval dan kontinyu dapat menurunkan kadar glukosa darah.

Rancangan yang digunakan dalam penelitian ini adalah ‘*The Pretest – Posttest Group design*’. Sampel dalam penelitian ini adalah penderita Diabetes Mellitus tipe 2 yang diambil dari Poli penyakit dalam RSUD Mataram berdomisili di sekitar Kota Mataram berjumlah 22 orang perempuan dengan umur antara 40 – 50 tahun. Pemilihan sampel dilakukan secara acak yang dibagi menjadi 2 kelompok yaitu kelompok Kontinyu dan kelompok Interval masing masing dengan 11 orang sampel. Sampel diambil darahnya untuk mengetahui kadar glukosa darah pada saat puasa (*pretest*), kemudian sampel melakukan latihan fisik dengan jalan kaki diatas treadmill selama 15 menit dengan pemanasan selama 3 – 5 menit. setelah 45 menit pemberian makan pagi. Segera setelah melakukan latihan fisik sampel diambil darahnya untuk data *posttest 1* dan 120 menit *postprandial* sampel kembali diambil darahnya untuk data *posttest 2* (1 jam setelah latihan). Variabel tergantung yang diukur adalah penurunan kadar glukosa darah *postprandial* dengan menghitung selisih kadar glukosa darah *postprandial* saat akan melakukan latihan fisik dan satu jam setelah selesai melakukan latihan fisik (kadar glukosa darah 60 menit – 120 *postprandial*), dan selisih kadar glukosa darah sebelum melakukan latihan fisik dan setelah satu jam selesai melakukan latihan fisik. (kadar glukosa darah 45 menit – 120 menit *postprandial*.) Penurunan kadar glukosa darah *postprandial* yang diamati dinyatakan dalam satuan mg/dl.

Hasil penelitian menunjukkan bahwa terdapat perbedaan yang tidak nyata (signifikan) rerata kadar glukosa darah puasa pada kelompok kontinyu dan kelompok interval sebagaimana ditunjukkan oleh uji beda sebagai berikut. $p = 0,297, > 0,05$; $X_{konty} = 202,7273, SE = 114,1609$; $X_{int} = 251,4545, SE = 98,6148$; $Mean\ diff \pm SE = 48,7273$. Perubahan Kadar Glukosa Darah pada kondisi 45 menit *postprandial* menjadi kondisi post latihan I pada kedua kelompok eksperimen menunjukkan adanya beda yang nyata (signifikan), sebagaimana terlihat pada hasil uji beda perubahan ; $p = 0,041, < 0,05$; $D_{kont} = 2,065, SE = 7,654$; $D_{int} = 26,117, SE = 7,654$; $Mean\ diff \pm SE = -24,052 \pm 10,966$. Hasil tersebut menunjukkan bahwa latihan Interval menghasilkan perubahan penurunan kadar glukosa darah > dari latihan Kontinyu. Perubahan Kadar glukosa darah pada kondisi post latihan I menjadi kondisi post latihan 2 kedua kelompok eksperimen menunjukkan adanya perbedaan yang nyata (signifikan) sebagaimana ditunjukkan oleh uji beda yang hasilnya sebagai berikut. ($p = 0,041, < 0,05$; $D_{kont} = 1,6364, SE = \pm 32,3551$; D_{int}

= 26,5455, SE= \pm 12,3642; Mean Diff - 24,052. Hasil tersebut menunjukkan bahwa latihan Interval menunjukkan penurunan Kadar glukosa darah > daripada latihan Kontinyu. Perubahan kadar glukosa darah dipengaruhi oleh banyak faktor antara lain: makanan, hormon insulin, glukagon, kortisol, dan adrenalin serta dipengaruhi oleh latihan fisik. Penelitian ini untuk membuktikan bahwa latihan fisik secara kontinyu dan Interval Intensitas sedang dapat menurunkan kadar glukosa darah

Kesimpulan dari penelitian ini menunjukkan bahwa latihan fisik intensitas sedang Interval dan Kontinyu dapat menurunkan kadar glukosa darah segera setelah latihan dan 1 jam setelah latihan (60'pp dan 120 pp), Latihan interval lebih menurunkan kadar glukosa darah dibandingkan dengan latihan kontinyu segera setelah latihan (posttes 1 – 45 menit Postprandial) dan Latihan interval maupun latihan kontinyu dapat menurunkan kadar glukosa darah (posttest 2- posttes 1).

Harapan bahwa hasil penelitian ini akan dapat memberikan tambahan informasi ilmiah bagi masyarakat ,khususnya bagi para instruktur senam diabetes mellitus maka Latihan fisik intensitas sedang interval dan kontinyu dapat dijadikan pilihan latihan dalam pengendalian kadar glukosa darah . tetapi masih diperlukan penelitian untuk lebih memperluas penjelasan teoritis dan penerapannya, misalnya penelitian terhadap kelompok resiko yang sama dengan menggunakan kelompok kontrol .



SUMMARY

The Comparison of the Effect of Continuous and Interval Moderate Intensity Physical Exercise on Blood Glucose Change in Diabetic Patients

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Diabetes remains a worldwide health problem with a high incidence in the last decade. In the mid of 1990s the prevalence of diagnosed diabetes among population aged 20 - 74 years in United States was 4.9%, increasing to 6.5%. The report of International Diabetes Federation (IDF) in 2003 indicated that the total number of diabetic patients in the world has alarmingly increased, and the cost for its management becomes three-times higher. Global Diabetes Statistics estimated that in 2003 there would be 333 million individuals with diabetes mellitus (DM), and the estimation for the same year in Indonesia would be 19.4 million individuals. To the year 2025, the prevalence of DM in Indonesia is estimated to be 12 - 23% of population aged more than 15 years. The figure tends to increase along with the improvement of economic growth. The objective of this study was to prove that interval and continuous moderate intensity exercise could reduce blood glucose.

This study used pretest - posttest group design. Samples were 22 female type 2 diabetic patients aged 40 - 50 years taken from Internal Outpatient Clinic, Mataram Hospital, who lived around Mataram. Samples were enrolled in random and allocated into two groups, i.e., continuous and interval groups, each comprising 11 samples. Blood was taken to identify fasting blood glucose (pretest), and samples were subjected to physical exercise by walking on treadmill for 15 minutes with warming up for 3 - 5 minutes 45 minutes after having breakfast. Immediately after physical exercise, blood was taken for posttest 1 data, and 120 minutes postprandial blood was taken again for posttest 2 data (1 hour after exercise). The measured dependent variable was the reduction of postprandial blood glucose by estimating the difference of postprandial blood glucose at the beginning of exercise and one hour after exercise (blood glucose 60 - 120 minutes postprandial), and the difference of blood glucose before and one hour after physical exercise (blood glucose 60 - 120 minutes postprandial). The observed postprandial blood glucose reduction was stated in mg/dl.

Results showed no significant difference in the mean of fasting blood glucose in continuous and interval groups, as seen from the results of discriminant test ($p = 0.297$). The change of blood glucose 45 minutes postprandial to post-exercise 1 in both experimental groups revealed significant difference, as also indicated from the discriminant test ($p = 0.041$). This indicated that interval exercise resulted in the change of blood glucose reduction that was higher than that resulted from continuous exercise. The change of blood glucose in post-exercise 1 to post-exercise 2 in both experimental groups showed significant difference ($p = 0.041$). This indicated that interval exercise resulted in blood glucose reduction more than that from continuous exercise. Blood glucose change is affected by a number of factors, such as diet, insulin hormone, glucagons, cortisol, adrenalin, including physical exercise. This study was aimed to prove that continuous and interval moderate intensity exercise could reduce blood glucose.

In conclusion, continuous and interval moderate intensity exercise can reduce blood glucose immediately and 1 hour after exercise (60 and 120 minutes postprandial). Interval exercise reduced blood glucose more than continuous exercise immediately after exercise (posttest 1 - 45 minutes postprandial), and both interval and continuous exercise can reduce blood glucose (posttest 2 - posttest 1). The results of this study can be regarded as scientific information for public, particularly for diabetes mellitus exercise instructors. Interval and continuous moderate intensity exercise can be used as alternative for controlling blood glucose level. However, further studies are needed to improve the theoretical elaboration and its application, such as by conducting research on group with the same risks with the involvement of control group.



ABSTRACT

The Comparison of the Effect of Continuous and Interval Moderate Intensity Physical Exercise on Blood Glucose Change in Diabetic Patients

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This study was conducted to identify the effect of continuous and interval moderate intensity physical exercise on the reduction of blood glucose in patients with diabetes mellitus. This study used pretest - posttest group design. Samples were 22 female patients with type 2 diabetes mellitus, aged 40 - 50 years. They were divided into 2 groups, i.e., continuous and interval groups. Exercise was carried out using treadmill for 15 minutes. Blood glucose was measured directly and 60 minutes after physical exercise. Blood glucose reduction immediately after exercise in interval group was higher than that in continuous group ($p = 0.041$). Blood glucose reduction 60 minutes after exercise in interval group was higher than that in continuous group ($p = 0.044$). Conclusively, interval and continuous moderate intensity physical exercise can reduce blood glucose immediately and 60 minutes after exercise. Interval exercise reduces more blood glucose as compared to continuous exercise.

Keywords: fasting blood glucose, diabetes mellitus, interval and continuous physical exercise