

# Pengaruh pemberian program latihan Kalistenik bersama latihan aerobik terhadap pengendalian kadar Glukosa darah pada individu pra-lanjut usia dengan Diabetes Melitus tipe 2 = The influence of callisthenics exercise along with aerobic exercise in controlling blood glucose level in older adult with type 2 diabetes mellitus

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## Abstrak

**Tujuan:** Tujuan penelitian ini adalah mengetahui pengaruh pemberian program latihan kalistenik bersama latihan aerobik terhadap pengendalian kadar glukosa darah, kekuatan otot serta kapasitas aerobik pada individu pra lanjut usia dengan DM tipe 2.

**Metode:** 30 subyek penelitian (26 laki-laki dan 4 perempuan) penderita DM tipe 2 tanpa komplikasi, berusia 44-54 tahun, dengan berat badan berlebih dan obesitas, mengikuti program latihan aerobik (jalan cepat) dan latihan kalistenik selanjutnya 8 minggu. Subyek dibagi dalam 2 kelompok yaitu 15 orang melakukan latihan jalan cepat dan kalistenik (kelompok ICA) dan 15 orang lainnya melakukan latihan jalan cepat saja (kelompok A). Frekuensi latihan jasmani adalah 3 kali per minggu (selang 1 hari). Intensitas latihan jalan cepat adalah sedang (60-80 % Heart Rate Reserve), durasi 30 menit. Latihan kalistenik dilakukan sebanyak 2 set kalistenik, setiap set terdiri dari 8 macam gerakan latihan kekuatan otot yang mewakili otot-otot besar tubuh. Repetisi setiap gerakan latihan adalah 15 kali. Latihan jasmani dilakukan di tempat latihan bersama dan di rumah masing-masing subyek penelitian. Nilai HbA1c, kadar glukosa darah puasa (GDP), kekuatan otot serta kapasitas aerobik diperiksa sebelum dan setelah program latihan jasmani.

**Hasil:** Nilai HbA1c dan GDP sebelum dan setelah latihan jasmani berbeda bermakna pada masing-masing kelompok ( $p < 0,05$ ). Besarnya perubahan kadar HbA1c dan GDP antara kedua kelompok tidak berbeda bermakna ( $p 0,454$ ). Kekuatan otot kelompok KA sebelum dan setelah latihan jasmani berbeda bermakna ( $p < 0,05$ ), Kapasitas aerobik sebelum dan setelah latihan jasmani berbeda bermakna pada masing-masing kelompok ( $p < 0,05$ ). Besarnya perubahan kapasitas aerobik antara kedua kelompok tidak berbeda bermakna ( $p 0,780$ ). Korelasi antara perbaikan kadar HbA1c dan GDP dengan perbaikan kekuatan otot dan kapasitas aerobik pada kedua kelompok setelah program latihan jasmani 8 minggu adalah lemah.

**Kesimpulan:** Pemberian program latihan kalistenik bersamaan dengan program latihan aerobik jalan cepat selama 8 minggu pada individu pra lanjut usia dengan DM tipe 2 tanpa komplikasi, berat badan lebih/obesitas I memberikan hasil pengendalian kadar glukosa darah dan kapasitas aerobik yang tidak berbeda dengan melakukan latihan aerobik jalan cepat saja, namun meningkatkan kekuatannya. Latihan kalistenik bersama aerobik dan latihan aerobik saja selama 8 minggu memperlihatkan korelasi lemah antara parameter pengendalian kadar glukosa darah dengan kapasitas aerobik dan kekuatan otot.

**Purpose:** The aim of this study was to examine the influence of callisthenics exercise simultaneously with aerobic exercise in controlling blood glucose level, muscle strength and aerobic capacity in older adult with type 2 Diabetes Mellitus (type 2 DM).

Methods: Thirty subjects (26 men, 4 women) with type 2 DM but without complication, age between 44-54 years old, have obesity or overweight, underwent the aerobic exercise program (brisk walking) and callisthenics exercise program for 8 weeks. Subjects divided into 2 groups, 15 subjects performed both brisk walking and callisthenics (group I CA), while the other 15 conducted only brisk walking (group A). The frequency of the exercise was set on 3 times per week on non consecutive days. The intensity of the brisk walking exercise was set on moderate intensity (60-80% HRR) with 30 min duration. The callisthenics exercise performed as 2 sets of 15 repetitions in 8 core muscle exercise (represent the whole large muscle group of the body). The exercise was performed in the subjects' home and once a week together in an exercise room. Glycosilated haemoglobin (HbA1c), fasting plasma glucose (FPG), muscle strength and aerobic capacity was evaluated before and after exercise program.

Results: HbA1c and FPG before and after exercise program were different significantly within each groups ( $p < 0,05$ ). The level of reduction of HbA1c and FPG between 2 groups was not significantly different ( $p 0,454$ ). The muscle strength of group KA was increased significantly after exercise program ( $p < 0,05$ ). The aerobic capacity before and after exercise program was different significantly within each groups ( $p < 0,05$ ). The level of increase of aerobic capacity between 2 groups was not significantly different ( $p 0,780$ ). The correlation between HbA1c and FPG to muscle strength and aerobic capacity after 8 weeks exercise program in both 2 groups was weak and not significant.

Conclution: The addition of callisthenics exercise program simultaneously with aerobic exercise program for 8 weeks to the older adult with type 2 DM reduced HbA1c and FPG and increased the aerobic capacity that were not different compare to only conducting aerobic exercise program, but increased muscle strength The correlation between the improvement in glycemic control and aerobic capacity and muscle strength after 8 weeks exercise program were weak.</i>