**Supp Table 1: Outcomes for the HIIT subgroup with intervention adherence >50%, compared with control**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | HIIT (n=9) |  |  | Control (n=15) |  |  |
| Variable | Baseline | 12 weeks | Change | Baseline | 12 weeks | Change |
| **Glucose control** |  |  |  |  |  |  |
| HbA1c (% NGSP units) | 8.78 ± 0.70 | 8.13 ± 1.21\* | -0.64 ± 0.64† | 8.37 ± 0.71 | 8.23 ± 0.95 | -0.14 ± 0.48 |
| HbA1c (mmol/mol) | 72.5 ± 7.7 | 65.4 ± 13.2\* | -7.0 ± 7.0† | 68.0 ± 7.8 | 66.5 ± 10.4 | -1.5 ± 5.2 |
| Insulin dose (units/kg/day) | 0.73 ± 0.24 | 0.71 ± 0.25 | -0.0 ± 0.1 | 0.72 ± 0.21 | 0.71 ± 0.25 | -0.01 ± 0.09 |
| Mean glucose (mmol/L) | 11.9 ± 1.6 | 10.5 ± 2.1\* | -1.4 ± 1.7 | 11.0 ± 1.8 | 9.7 ± 2.0\* | -1.2 ± 1.8 |
| CV glucose (%) | 39.6 ± 7.4 | 41.8 ± 8.8 | 2.1 ± 7.4 | 43.1 ± 8.2 | 45.3 ± 10.5 | -2.1 ± 7.6 |
| Time in hypoglycemia (%) | 3.9 ± 5.2 | 6.0 ± 4.0 | 2.1 ± 4.3 | 6.5 ± 6.8 | 10.5 ± 9.4\* | 4.0 ± 6.2 |
| Time in target (%) | 33.0 ± 9.3 | 46.2 ± 19.6 | 13.2 ± 17.3 | 39.7 ± 11.4 | 46.5 ± 12.5 | 6.8 ± 12.2 |
| Time in hyperglycemia (%) | 63.1 ± 12.2 | 47.8 ± 19.8\* | -15.3 ± 18.6 | 53.8 ± 13.8 | 43.0 ± 15.6\* | -10.8 ± 15.4 |
|  |  |  |  |  |  |  |
| **Anthropometric measures** |  |  |  |  |  |  |
| Weight (kg) | 88.1 ± 10.5 | 88.5 ± 10.3 | 0.4 ± 1.6 | 92.2 ± 16.7 | 93.5 ± 17.0\* | 1.3 ± 1.8 |
| BMI (kg/m2) | 28.9 ± 2.0† | 29.1 ± 2.1† | 0.2 ± 0.6 | 31.6 ± 3.4 | 32.0 ± 3.5\* | 0.4 ± 0.6 |
| Waist circumference (cm) | 102.7 ± 9.8 | 103.9 ± 8.4 | 1.2 ± 4.7 | 106.6 ± 12.5 | 109.5 ± 10.8\* | 2.9 ± 4.2 |
| Fat mass (%) | 38.0 ± 4.8 | 37.4 ± 4.1 | -0.6 ± 1.5 | 37.2 ± 6.3 | 37.6 ± 5.8 | 0.4 ± 1.3 |
| Total body fat mass (kg) | 32.9 ± 6.0 | 32.4 ± 4.9 | -0.4 ± 1.7 | 33.2 ± 6.0 | 34.1 ± 6.4\* | 0.9 ± 1.6 |
| Total body lean mass (kg) | 53.5 ± 7.0 | 54.4 ± 7.4\* | 0.9 ± 1.0 | 57.2 ± 13.2 | 57.5 ± 13.0 | 0.3 ± 1.5 |
| Visceral adipose tissue mass (kg) | 0.8 ± 0.4 | 0.8 ± 0.3 | -0.0 ± 0.1 | 0.8 ± 0.2 | 0.8 ± 0.2 | 0.0 ± 0.1 |
|  |  |  |  |  |  |  |
| **Cardiovascular measures** |  |  |  |  |  |  |
| Systolic blood pressure (mmHg) | 135 ±18 | 134 ± 12 | -1 ± 13 | 137 ± 9 | 132 ± 11 | -4.6 ± 11.3 |
| Diastolic blood pressure (mmHg) | 79 ± 8 | 77 ± 8 | -2 ± 8 | 78 ± 9 | 80 ± 8 | 2.1 ± 8.8 |
| Mean arterial pressure (mmHg) | 97 ± 9 | 95 ± 9 | -2 ± 9 | 97 ± 9 | 97 ± 8 | -0 ± 8 |
| Augmentation index | 18.7 ± 9.2 | 22.4 ± 10.7 | 3.8 ± 7.5 | 18.4 ± 13.8 | 23.1 ± 14.0 | 5 ± 9 \* |
| aPWV (m/s) | 7.6 ± 3.3 | 8.3 ± 2.2 | 0.7 ± 2.6 | 8.9 ± 1.9 | 8.6 ± 1.7 | -0.3 ± 1.3 |
| Ewing score | 1.0 ± 0.9 | 0.6 ± 0.7 | -0.4 ± 0.7 | 1.9 ± 2.0 | 1.4 ± 1.3 | -0.5 ± 1.8 |
|  |  |  |  |  |  |  |
| **Biochemistry** |  |  |  |  |  |  |
| Total cholesterol (mmol/L) | 4.6 ± 0.9 | 4.8 ± 1.3 | 0.2 ± 1.1 | 4.6 ± 1.0 | 4.7 ± 1.0 | 0.0 ± 0.5 |
| LDL (mmol/L) | 2.5 ± 0.7 | 2.5 ± 0.9 | 0.1 ± 0.8 | 2.2 ± 0.7 | 2.5 ± 1.0 | 0.3 ± 0.7 |
| HDL (mmol/L) | 1.6 ± 0.4 | 1.6 ± 0.6 | 0.1 ± 0.3 | 1.8 ± 0.7 | 1.6 ± 0.4 | -0.1 ± 0.6 |
| Triglycerides (mmol/L) | 1.3 ± 0.5 | 1.4 ± 0.8 | 0.1 ± 0.7 | 1.4 ± 1.4 | 1.2 ± 0.8 | -0.2 ± 0.6 |
| Apolipoprotein A1 (g/L) | 1.7 ± 0.3 | 1.6 ± 0.3 | -0.0 ± 0.1 | 1.6 ± 0.2 | 1.6 ± 0.2 | -0.0 ± 0.1 |
| Apolipoprotein B (g/L) | 0.9 ± 0.2 | 0.9 ± 0.3 | 0.0 ± 0.2 | 0.9 ± 0.3 | 0.9 ± 0.3 | 0.0 ± 0.2 |
| Leptin (ng/mL) | 31.5 ± 15.4 | 42.8 ± 16.3 | 11.4 ± 16.6 | 35.2 ± 16.5 | 43.8 ± 26.1 | 8.6 ± 15.9 |
| Adiponectin (µg/mL) | 15.1 ± 9.6 | 16.3 ± 14.0 | 1.2 ± 6.1 | 14.1 ± 7.8 | 13.5 ± 8.0 | -0.6 ± 4.4 |
| hsCRP (mg/L) | 3.0 ± 2.7 | 3.5 ± 3.1 | 0.5 ± 2.4 | 3.1 ± 3.3 | 3.4 ± 3.3 | 0.3 ± 2.3 |
| Urine ACR (mg/mmol) | 3.0 ± 4.5 | 2.2 ± 2.4 | -0.8 ± 2.4 | 6.7 ± 14.1 | 4.9 ± 9.9 | -1.7 ± 5.5 |
|  |  |  |  |  |  |  |
| **Exercise parameters** |  |  |  |  |  |  |
| VO2peak (mL/kg/min) | 31.4 ± 5.3 | 29.4 ± 3.5 | -2.0 ± 3.9 | 28.7 ± 5.8 | 26.6 ± 6.3 | -2.1 ± 5.0 |
| Bruce protocol time (sec) | 741 ± 118 | 803 ± 108\* | 62 ± 49 | 717 ± 160 | 755 ± 179 | 38 ± 87 |
| Chest press (N) | 461 ± 190 | 486 ± 197 | 24 ± 38 | 496 ± 213 | 481 ± 204 | -15 ± 5758 |
| Leg press (N) | 2478 ± 952 | 3133 ± 1042\* | 656 ± 324† | 2986 ± 1237 | 3129 ± 1161 | 143 ± 426 |
| Sit and reach (cm) | -4.4 ± 15.4 | -3.7 ± 14.7 | 0.8 ± 3.7 | -6.7 ± 10.8 | -9.3 ± 10.1 | -2.7 ± 7.9 |
|  |  |  |  |  |  |  |
| **Questionnaires** |  |  |  |  |  |  |
| HFS score | 38.4 ± 22.4 | 32.0 ± 16.9 | -6.4 ± 10.6 | 37 ± 19 | 30 ± 18\* | -6.8 ± 11.2 |
| DQOL score | 115.8 ± 28.2† | 108.9 ± 25.1† | -6.9 ± 15.1 | 92 ± 22 | 85 ± 18 | -7.1 ± 16.8 |

\*p<0.05 vs Baseline, †p<0.05 vs Control

CV, Coefficient of variation; BMI, Body mass index; aPWV, aortic pulse wave velocity; hsCRP, high-sensitivity C-reactive protein; ACR, Albumin: creatinine ratio; HFS, Hypoglycemia Fear Survey; DQOL Diabetes Quality of Life,

Time in hypoglycemia (glucose ≤ 3.9mmol/L), Time in target (glucose 4.0-10.0mmol/L), Time in hyperglycemia (glucose >10.0mmol/L)

**Supplementary Table 2: Outcomes for all participants who undertook 12-week HIIT intervention (n=24)**

|  |  |  |  |
| --- | --- | --- | --- |
|  | HIIT (n=24) |  |  |
| Variable | Pre-exercise | Post-exercise | Change |
| **Glucose control** |  |  |  |
| HbA1c (% NGSP units) | 8.44 ± 0.84 | 8.05 ± 1.01\* | -0.40 ± 0.62 |
| HbA1c (mmol/mol) | 68.7 ± 9.2 | 64.5 ± 11.0\* | -4.4 ± 6.8 |
| Insulin dose (units/kg/day) | 0.71 ± 0.24 | 0.69 ± 0.23 | -0.02 ± 0.11 |
| Mean glucose (mmol/L) | 10.8 ± 2.1 | 10.2 ± 1.6 | -0.6 ± 2.0 |
| CV glucose (%) | 42.6 ± 8.8 | 43.6 ± 6.6 | 1.0 ± 8.3 |
| Time in hypoglycemia (%) | 7.0 ± 7.7 | 7.6 ± 4.9 | 0.6 ± 7.5 |
| Time in target (%) | 40.4 ± 12.9 | 45.9 ± 14.6 | 5.5 ± 16.1 |
| Time in hyperglycemia (%) | 52.6 ± 16.9 | 46.5 ± 14.9 | -6.1 ± 19.8 |
|  |  |  |  |
| **Anthropometric measures** |  |  |  |
| Weight (kg) | 91.1 ±13.4 | 91.0 ± 12.5 | -0.1 ± 1.9 |
| BMI (kg/m2) | 30.0 ± 2.7 | 30.1 ± 2.6 | 0.0 ± 0.6 |
| Waist circumference (cm) | 105.3 ± 11.1 | 104.2 ± 9.6 | -1.0 ± 4.2 |
| Fat mass (%) | 37.2 ± 5.6 | 37.0 ± 5.5 | -0.2 ± 1.2 |
| Total body fat mass (kg) | 33.0 ± 5.9 | 32.8 ± 5.4 | -0.2 ± 1.3 |
| Total body lean mass (kg) | 56.3 ± 10.1 | 56.3 ± 10.1 | 0.1 ± 1.4 |
| Visceral adipose tissue mass (kg) | 0.8 ± 0.3 | 0.7 ± 0.2 | -0.0 ± 0.1 |
|  |  |  |  |
| **Cardiovascular measures** |  |  |  |
| Systolic blood pressure (mmHg) | 132 ± 13 | 132 ± 14 | 0.0 ± 14 |
| Diastolic blood pressure (mmHg) | 78 ± 8 | 77 ± 9 | -1 ± 9 |
| Mean arterial pressure (mmHg) | 95 ± 8 | 94 ± 11 | -1 ± 10 |
| Augmentation index | 18.7 ± 12.8 | 17.7 ± 14.2 | -1.0 ± 10.0 |
| aPWV (m/s) | 8.2 ± 2.5 | 8.0 ± 1.9 | -0.2 ± 2.1 |
| Ewing score | 1.1 ± 1.0 | 0.9 ± 1.3 | -0.3 ± 1.3 |
|  |  |  |  |
| **Biochemistry** |  |  |  |
| Total cholesterol (mmol/L) | 4.6 ± 1.0 | 4.7 ± 1.2 | 0.1 ± 0.8 |
| LDL (mmol/L) | 2.6 ± 0.9 | 2.5 ± 0.9 | -0.0 ± 0.7 |
| HDL (mmol/L) | 1.6 ± 0.3 | 1.6 ± 0.4 | 0.0 ± 0.2 |
| Triglycerides (mmol/L) | 1.2 ± 0.5 | 1.2 ± 0.7 | 0.1 ± 0.5 |
| Apolipoprotein A1 (g/L) | 1.6 ± 0.3 | 1.6 ± 0.3 | 0.0 ± 0.2 |
| Apolipoprotein B (g/L) | 0.9 ± 0.3 | 0.9 ± 0.3 | -0.0 ± 0.2 |
| Leptin (ng/mL) | 36.3 ± 21.6 | 46.6 ± 38.8 | 10.3 ± 26.2 |
| Adiponectin (µg/mL) | 14.5 ± 7.7 | 14.5 ± 9.5 | 0.0 ± 4.9 |
| hsCRP (mg/L) | 3.3 ± 3.7 | 2.9 ± 2.9 | -0.3 ± 2.0 |
| Urine ACR (mg/mmol) | 3.3 ± 7.4 | 3.6 ± 10.2 | 0.3 ± 3.6 |
|  |  |  |  |
| **Exercise parameters** |  |  |  |
| VO2peak (mL/kg/min) | 29.0 ± 5.9 | 29.1 ± 5.3 | 0.1 ± 4.3 |
| Bruce protocol time (sec) | 745 ± 163 | 813 ± 166\* | 68 ± 60 |
| Chest press (N) | 482 ± 183 | 480 ± 177 | -2 ± 70 |
| Leg press (N) | 2755 ± 1091 | 3200 ± 1120\* | 445 ± 375 |
| Sit and reach (cm) | -7.0 ± 12.5 | -4.3 ± 11.0\* | 2.7 ± 3.8 |
|  |  |  |  |
| **Questionnaires** |  |  |  |
| HFS score | 36.6 ± 23.5 | 36.0 ± 23.9 | -0.6 ± 10.0 |
| DQOL score | 100.3 ± 27.0 | 98.2 ± 29.3 | -2.1 ± 14.6 |

\* p<0.05 vs Baseline

CV, Coefficient of variation; BMI, Body mass index; aPWV, aortic pulse wave velocity; hsCRP, high-sensitivity C-reactive protein; ACR, Albumin: creatinine ratio; HFS, Hypoglycemia Fear Survey; DQOL Diabetes Quality of Life,

Time in hypoglycemia (glucose ≤ 3.9mmol/L), Time in target (glucose 4.0-10.0mmol/L), Time in hyperglycemia (glucose >10.0mmol/L)

**Supplementary Table 3: Outcomes for participants in the intervention group who undertook 24-weeks HIIT (n=10)**

|  |  |  |  |
| --- | --- | --- | --- |
|  | HIIT (n=10) |  |  |
| Variable | Baseline | 12 weeks | 24 weeks |
| **Glucose control** |  |  |  |
| HbA1c (% NGSP units) | 8.74 ± 0.67 | 8.10 ± 1.15\* | 8.24 ± 1.03\* |
| HbA1c (mmol/mol) | 72.0 ± 7.3 | 65.0 ± 12.6\* | 66.6 ± 11.3\* |
| Insulin dose (units/kg/day) | 0.72 ± 0.22 | 0.70 ± 0.2 | 0.71 ± 0.22 |
| Mean glucose (mmol/L) | 11.6 ± 1.9 | 10.5 ± 2.0 | 10.6 ± 1.7 |
| CV glucose (%) | 41.1 ± 8.4 | 42.0 ± 8.4 | 40.5 ± 6.2 |
| Time in hypoglycemia (%) | 5.2 ± 6.4 | 6.5 ± 4.1 | 5.8 ± 5.0 |
| Time in target (%) | 34.8 ± 10.5 | 45.2 ± 18.8 | 43.4 ± 12.1 |
| Time in hyperglycemia (%) | 59.9 ± 15.2 | 48.3 ± 18.7 | 50.7 ± 13.5 |
|  |  |  |  |
| **Anthropometric measures** |  |  |  |
| Weight (kg) | 88.8 ± 10.1 | 89.1 ± 9.9 | 89.6 ± 9.5 |
| BMI (kg/m2) | 28.8 ± 1.9 | 29.0 ± 2.1 | 29.1 ± 1.7 |
| Waist circumference (cm) | 102.5 ± 9.2 | 103.4 ± 8.1 | 104.3 ± 6.7 |
| Fat mass (%) | 36.9 ± 5.7 | 36.4 ± 5.1 | 36.5 ± 5.0 |
| Total body fat mass (kg) | 32.1 ± 6.1 | 31.7 ± 5.2 | 32.0 ± 4.9 |
| Total body lean mass (kg) | 55.0 ± 8.2 | 55.6 ± 8.0 | 55.9 ± 8.0\* |
| Visceral adipose tissue mass (kg) | 0.8 ± 0.4 | 0.7 ± 0.3 | 0.8 ± 0.3 |
|  |  |  |  |
| **Cardiovascular measures** |  |  |  |
| Systolic blood pressure (mmHg) | 133 ± 17 | 132 ± 13 | 136 ± 13 |
| Diastolic blood pressure (mmHg) | 79 ± 8 | 77 ± 8 | 77 ± 8 |
| Mean arterial pressure (mmHg) | 96 ± 9 | 94 ± 9 | 96 ± 10 |
| Augmentation index | 16.6 ± 10.8 | 18.4 ± 16.3 | 18.4 ± 15.4 |
| aPWV (m/s) | 7.6 ± 3.1 | 8.2 ± 2.1 | 8.4 ± 1.5 |
| Ewing score | 1.0 ± 0.8 | 0.6 ± 0.7 | 1.2 ± 1.1 |
|  |  |  |  |
| **Biochemistry** |  |  |  |
| Total cholesterol (mmol/L) | 4.6 ± 0.9 | 4.6 ± 0.9 | 4.9 ± 1.1 |
| LDL (mmol/L) | 2.4 ± 0.7 | 2.4 ± 0.7 | 2.6 ± 0.9 |
| HDL (mmol/L) | 1.5 ± 0.4 | 1.6 ± 0.6 | 1.6 ± 0.5 |
| Triglycerides (mmol/L) | 1.2 ± 0.5 | 1.3 ± 0.8 | 1.6 ± 1.1 |
| Apolipoprotein A1 (g/L) | 1.6 ± 0.3 | 1.6 ± 0.3 | 1.6 ± 0.3 |
| Apolipoprotein B (g/L) | 0.9 ± 0.2 | 0.9 ± 0.3 | 1.0 ± 0.3 |
| Leptin (ng/mL) | 30.3 ± 15.0 | 40.1 ± 17.6 | 48.9 ± 20.0\* |
| Adiponectin (µg/mL) | 15.3 ± 9.0 | 16.5 ± 13.2 | 172 ± 11.6 |
| hsCRP (mg/L) | 2.8 ± 2.6 | 3.2 ± 3.1 | 3.7 ± 3.4 |
| Urine ACR (mg/mmol) | 2.8 ± 4.3 | 2.2 ± 2.2 | 2.2 ± 4.6 |
|  |  |  |  |
| **Exercise parameters** |  |  |  |
| VO2peak (mL/kg/min) | 30.4 ± 5.8 | 29.9 ± 3.7 | 29.3 ± 4.0 |
| Bruce protocol time (sec) | 758 ± 123 | 820 ± 116\* | 822 ± 126\* |
| Chest press (N) | 454 ± 192 | 481 ± 183 | 469 ± 210 |
| Leg press (N) | 2540 ± 919 | 3160 ± 986\* | 3030 ± 868\* |
| Sit and reach (cm) | -3.7 ± 14.7 | -3.0 ± 14.0 | -2.3 ± 13.7 |
|  |  |  |  |
| **Questionnaires** |  |  |  |
| HFS score | 38.5 ± 21.1 | 34.0 ± 17.1 | 36.8 ± 21.7 |
| DQOL score | 114.5 ± 26.9 | 109.1 ± 23.7 | 113.3 ± 27.8 |

\*p<0.05 vs Baseline

CV, Coefficient of variation; BMI, Body mass index; aPWV, aortic pulse wave velocity; hsCRP, high-sensitivity C-reactive protein; ACR, Albumin: creatinine ratio; HFS, Hypoglycemia Fear Survey; DQOL Diabetes Quality of Life,

Time in hypoglycemia (glucose ≤ 3.9mmol/L), Time in target (glucose 4.0-10.0mmol/L), Time in hyperglycemia (glucose >10.0mmol/L)