Cardiometabolic health improvements in the workplace: the effects of exercise supervision during a 16-week randomised controlled trial

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1. Aims

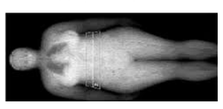
Reviews of workplace physical activity interventions indicate limited effects of these programs on employee health (1) and fitness (2). Supervised exercise supervision has shown greater health and fitness benefits compared to unsupervised and home-based exercise in clinical populations. This randomised controlled trial compared the effectiveness of personal, non-personal and no-exercise supervision in the workplace to improve cardiorespiratory fitness (CRF), muscular strength and body composition.

2. Methods

Eighty-five Australian university employees (62 female; mean±SD 43.2±9.8 years) were randomised to either personal (1:1; SUP, N=28) supervision, non-personal (typical gym-based approx. 1:10; NPS, N=28) supervision or unsupervised control (CON, N=29) exercise groups. Participants received an individually tailored, moderate-to-high intensity aerobic and resistance exercise program to complete for 16 weeks at an onsite gymnasium (SUP and NPS) or without access to a specific exercise facility (CON). Changes to CRF ($\dot{V}O_2$ peak), muscular strength (1RM bench and leg press) and body composition (body fat % and lean mass) were analysed using repeated measures ANOVA (intention-to-treat).

Cardiorespiratory Fitness (CRF): $\dot{V}O_2$ peak (ml·kg·min^{-1}) was assessed by incremental cycle test until voluntary exhaustion using indirect calorimetry.

Muscular Strength: Maximum upper body (bench press) and lower body (leg press) strength (kg) was assessed using incremental 1RM tests.



Anthropometry: Body fat (%) and lean mass (kg) was assessed using dual-energy x-ray absorptiometry (DXA).

3. Results

Cardiorespiratory Fitness (CRF) and Muscular Strength

- Mean changes to CRF were greater with SUP (mean±SD: +10.4±11.1%) compared to CON (+3.8±8.9%; p<0.01), but not different to NPS (+8.6±8.2%).
- When compared to CON (mean±SD: +1.7±7.7%), mean upper body strength changes were significantly greater with both SUP (+12.8±8.4%; p<0.001) and NPS (+8.4±7.3%; p<0.05).
- Mean lower body strength changes were greater with SUP (mean±SD: +26.3±12.7%) compared to both NPS (+15.0±14.6%; p<0.05) and CON (+4.1±12.4%; p<0.001), and NPS compared to CON (p<0.01).

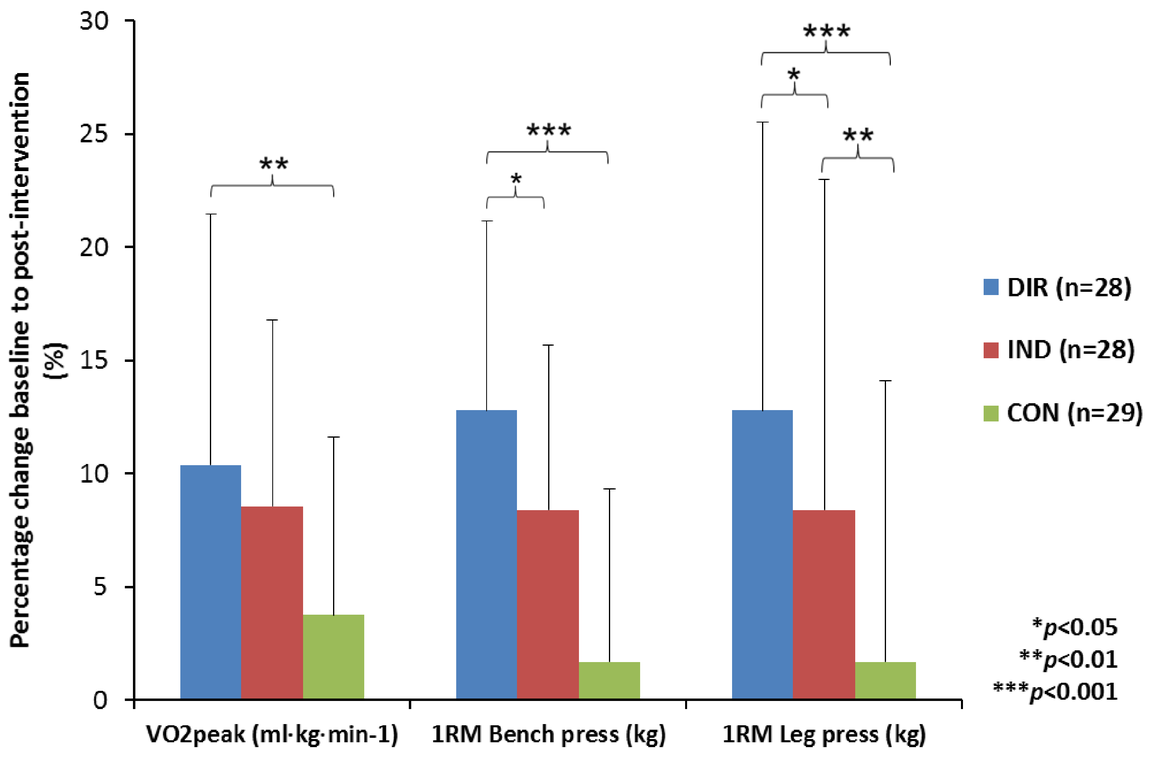


Figure 1: Changes to exercise capacity for personally supervised (1:1, SUP), non-personally supervised (standard gym, NPS) and unsupervised (CON) groups after the 16-week exercise intervention.

Anthropometry

- Mean reductions to body fat percentage were greater with SUP (mean±SD: -2.2±2.2%) compared to both NPS (-0.6±1.9%; p<0.05) and CON (-0.7±1.9%; p<0.05).
- Mean increases to lean body mass were greater with SUP (mean±SD: +1.2±1.2kg) compared to NPS (-0.3±1.3kg; p<0.01) but not different to CON (+0.6±1.2kg).

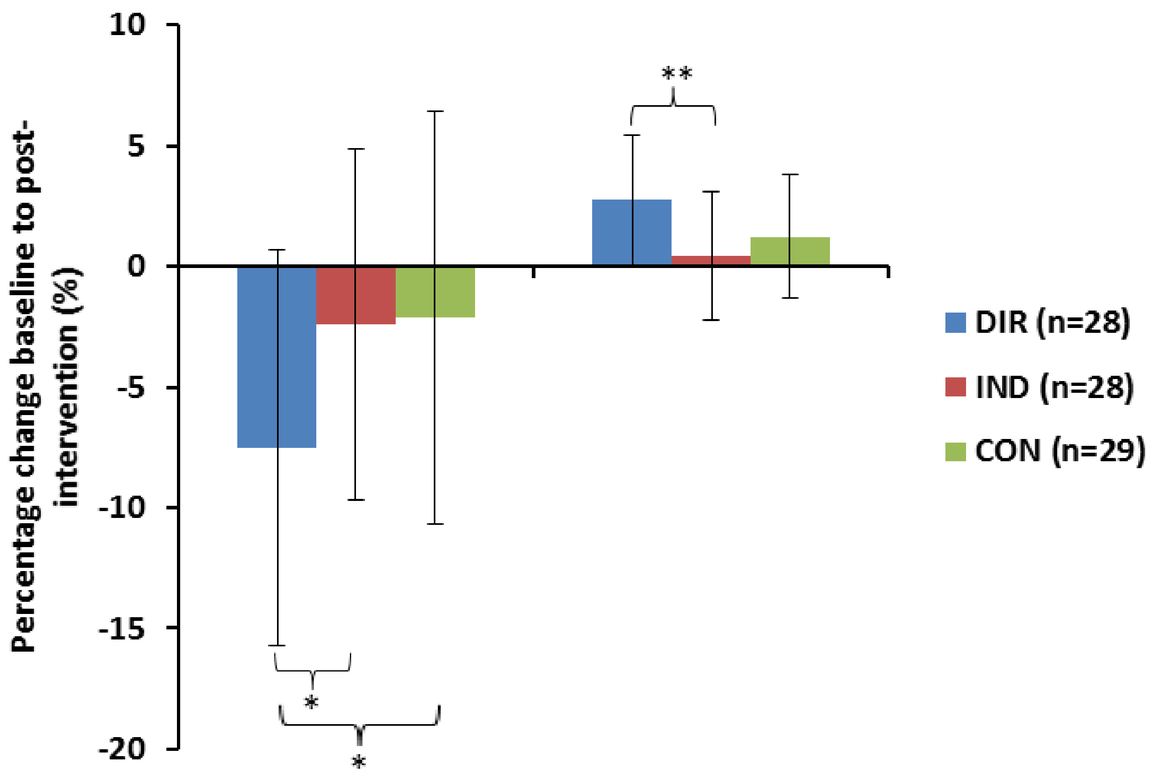


Figure 2: Changes to body composition for personally supervised (1:1, SUP), non-personally supervised (standard gym, NPS) and unsupervised (CON) after the 16-week exercise intervention.

4. Conclusions

- Providing a moderate-vigorous aerobic and resistance exercise training program at an onsite exercise facility with either personal or non-personal supervision enables increased CRF over a 16-week intervention.
- Personal exercise supervision, in addition to an onsite exercise facility, produced greater improvements to muscular strength and body composition than simply providing access to an onsite exercise facility and/or an individually tailored exercise program to be completed elsewhere.
- To improve cardiometabolic health in a university workplace, employers should consider providing at least 16-weeks of supervised exercise training at an onsite facility.

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6. References

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