Using mobile health applications to enhance cardiorespiratory fitness and body composition in obese adults

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Background: In order to improve the health of people suffering from chronic diseases, such as obesity, the importance of home follow-up is increasingly evident, even with the use of the modern technologies. At the Centre for the Prescription of Physical Exercise, has been developed a path that includes an outpatient examination of subjects, the preparation of a specific training program that will be proposed and monitored at home through a specific Application, carried out by the research group. Specifically, the purposes of this study were to investigate changes in body composition, aerobic performance ($V'O_2max$), ventilatory thresholds and adherence induced by a 24-week either polarized (POL) or threshold (THR) program, in obese male adults under their normal living conditions with a specific Application. A running competition was done at the end of the training period.

Methods: Twenty male volunteers (mean age 39.8±6.3 y; mean body mass index [BMI] 31.6±2.7 $kg \cdot m^{-2}$) participated in this study (n: 10 POL, n: 10 THR), performed 3 sessions a week, for 24 weeks, supervised online by researchers. At baseline (PRE) and at the end of the training period (POST), body composition and physical capacities were measured. POL group performed ~85-90% of total training below the first ventilatory threshold, and the remaining 10-15% above the second ventilatory threshold. The THR group performed ~65-70% of total training below the first ventilator thresholds, and the remaining 20-30% between the two ventilatory thresholds.

Results: At POST, body mass (BM) and fat mass (FM) decreased similarly by -3.20±3.10 kg ($P<0.05$) and by -3.80±2.80 kg ($P<0.05$) in POL and THR groups. $V'O_2max$ and $V'O_2$ at respiration compensation point (RCP) increased more in the POL group (+8.5±12.2 and +9.0±17.0 %, $P<0.05$) than THR group (+4.24±8.64 and +4.0±6.70%, $P<0.05$), while $V'O_2$ at gas exchange threshold (GET) increased similarly in both groups (+12.8±12.0 %, $P<0.05$). Adherence to training was 92.3±10.1 and 87.7±10.8% of training sessions for the POL and THR groups, respectively ($P=0.253$). Finally, at POST, 8 participants run a half marathon, 3 participants a 30km and 6 a marathon.

Conclusions: POL and THR were equally effective in improving body composition in male obese subjects. On the contrary, POL training improved $V'O_2max$ and $V'O_2$ at RCP more than THR, without difference in $V'O_2$ at GET. The competition at the end of the study was crucial to kept high the adherence to training. Thus, the results of this study could provide the foundation that over a long period of time (i.e., ≥ 24 weeks) specific application was essential to follow participants in their normal living conditions.