https://doi.org/10.6063/motricidade.31788

Abstract

Effects of green exercise program on body composition and connection with nature in postmenopausal women

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Conflict of interest: nothing to declare. **Funding:** nothing to declare.

There is evidence that green exercise (physical activity performed in natural or urban spaces with vegetation) generates physical and psychological health benefits and promotes emotional connection to the natural environment. However, few studies quantify these effects, namely on postmenopausal women. This study investigated the influence of a 16-week green exercise program on body composition and nature connectedness in postmenopausal women. A total of 122 women were allocated to a control (CG, n=34) or an exercise (EG, n=88) group. The EG followed a 16-week (3 days/week, 60 min/session) green multimodal exercise program with the cardiorespiratory work (30 min, 40 -75 % HRR) developed in contact with nature. Fat mass (FM, kg and %), visceral fat level (VFL), skeletal muscle mass (SMM), and appendicular skeletal muscle mass adjusted for body size (ASM/height^2) were evaluated using the bioimpedance InBody 120. Participants' relationship with the natural environment was assessed using the Nature Relatedness Scale

(NRS) and triaxial accelerometers wGT3X-BT to measure moderate-vigorous physical activity. Absolute and relative changes in quantitative variables were calculated, and Student´s t-tests and Mann–Whitney test were applied. The statistical significance was set at $p \leq 0.05$. Most women had been menopausal for more than 6 years (55.9% and 53.4% in CG and EG, respectively) and exhibited natural menopause (97.1% and 89.9%). No differences were identified between the groups for the initial values of the variables, except for the total value of the NRS scale (3.62 points in CG and 3.50 points in EG, $p=0.01$). Both groups showed a reduction ($p \leq 0.01$) in FM (-0.79% and -2.48% in CG and EG, respectively) and VFL (-0.62 and -1.52 points) and an improvement in muscular condition (0.14 kg/m^2 and 0.20 kg/m^2, $p<0.01$). Differences ($p<0.01$) were identified between the two groups for Δ%FM (4.52±0.96%) and ΔVFL (7.39±2.11%). In early (up to 6 years at menopause) and late postmenopause, differences were identified between the two ps for the Δ%FM ($p \leq 0.03$). In the presence of a more recent menopause, these differences were also recognised for ΔASM/height^2 ($p<0.01$). The EG improved their connection to nature (+0.07 points, $p<0.01$), but no differences were observed in the relative changes exhibited by the two groups. Our results suggest that the 16-week green exercise program improved adiposity levels, regardless of the time of menopause and muscle condition in early postmenopausal women. However, the intervention was not effective in improving the women's connection to nature.

Keywords: Physical activity, nature, menopause, adiposity, muscle, connection with nature.

Acknowledgements

The authors wish to acknowledge to Penafiel City Hall and Grouping of Health Centers of Tâmega II - Vale do Sousa Sul for their contributions to the program Meno(s)Pausa+Movimento.