

Effect of 12 Weeks Pedometer-Based Workplace Program on Inflammation and Arterial Stiffness in Young Men with Cardiovascular Risks

Authors : Norsuhana Omar, Amilia Aminuddina Zaiton Zakaria, Raifana Rosa Mohamad Sattar, Kalaivani Chellappan, Mohd Alauddin Mohd Ali, Norizam Salamt, Zanariyah Asmawi, Norliza Saari, Aini Farzana Zulkefli, Nor Anita Megat Mohd. Nordin

Abstract : Inflammation plays an important role in the pathogenesis of vascular dysfunction leading to arterial stiffness. Pulse wave velocity (PWV) and augmentation index (AI), as tools for the assessment of vascular damages are widely used and have been shown to predict cardiovascular disease (CVD). C-reactive protein (CRP) is a marker of inflammation. Several studies noted that regular exercise is associated with reduced arterial stiffness. The lack of exercise among Malaysians and the increasing CVD morbidity and mortality among young men are of concern. In Malaysia data on the workplace exercise intervention is scarce. A programme was designed to enable subjects to increase their level of walking as part of their daily work routine and self-monitored by using pedometers. The aim of this study to evaluate the reducing of inflammation by measuring CRP and improvement arterial stiffness measured by carotid femoral PWV (PWVCF) and AI. A total of 70 young men (20 - 40 years) who were sedentary, achieving less than 5,000 steps/day in casual walking with 2 or more cardiovascular risk factors were recruited in Institute of Vocational Skills for Youth (IKBN Hulu Langat). Subjects were randomly assigned to a control (CG) (n=34; no change in walking) and pedometer group (PG) (n=36; minimum target: 8,000 steps/day). The CRP was measured by using immunological method while PWVCF and AI were measured using Vicorder. All parameters were measured at baseline and after 12 weeks. Data for analysis was conducted using Statistical Package of Social Sciences Version 22 (SPSS Inc., Chicago, IL, USA). At post intervention, the CG step counts were similar (4983 ± 366 vs 5697 ± 407 steps/day). The PG increased step count from 4996 ± 805 to $10,128 \pm 511$ steps/day ($P < 0.001$). The PG showed significant improvement in anthropometric variables and lipid (time and group effect $p < 0.001$). For vascular assessment, the PG showed significantly decreased for time and effect ($p < 0.001$) for PWV (7.21 ± 0.83 to 6.42 ± 0.89 m/s; AI (11.88 ± 6.25 to 8.83 ± 3.7 %) and CRP (pre= 2.28 ± 3.09 , post= 1.08 ± 1.37 mg/L). However, no changes were seen in CG. As a conclusion, a pedometer-based walking programme may be an effective strategy for promoting increased daily physical activity which reduces cardiovascular risk markers and thus improve cardiovascular health in terms of inflammation and arterial stiffness. The community intervention for health maintenance has potential to adopt walking as an exercise and adopting vascular fitness index as the performance measuring tools.

Keywords : arterial stiffness, exercise, inflammation, pedometer

Conference Title : ICCBBE 2015 : International Conference on Computational Biology and Biomedical Engineering

Conference Location : Sydney, Australia

Conference Dates : December 10-11, 2015