Service Priorities and Programmes

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The effect of whole body vibration and exercise on muscle strength, balance and mobility in nursing home residents: A randomized controlled trial

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Introduction

Whole body vibration (WBV) was found to have potential beneficial effects on improving muscle strength and balance in elderly. Characterized by the simple exercise instructions involved and little space requirement, WBV could be particularly suitable for elderly living in nursing homes, who often have more physical and cognitive impairments.

Objectives

This study aimed at (1) evaluating the effect of exercise on muscle strength, balance and mobility in elderly living in nursing homes, and (2) to determine whether incorporating WBV training into the exercise protocol led to any additional therapeutic effects.

Methodology

Seventy-three elderly (33 men, 40 women; mean age = 82.3±7.3 years) participated in this study and were randomized into three groups: (1) WBV group, (2) exercise group, or (3) control group. All three groups were engaged in exercise training 3 times a week for 8 weeks. The WBV group and exercise group received the same training protocol including strengthening and balance exercises, except that WBV was added to some of the exercises in the WBV group (i.e. dynamic semi-squats, toe rises, and single leg standing). The control group received upper limb exercises only. Outcome measures included 5-times-sit-to-stand test (test of lower limb muscle strength), Berg Balance Scale (BBS) and Timed-up-and-go test (TUG). Two-way ANOVA with

repeated measures was used to analyze the data (Between group factor: exercise group; Within group factor: time). Post-hoc Wilcoxon Signed Rank Test would be used to compare the pre and post training assessment score for each group in case that the time × group interaction effect was significant.

Result

Result: Significant main effect of time ($p=0.029$) and time × group interaction effect ($p=0.027$) were found for the 5-times-sit-to-stand test. Post-hoc analysis revealed significant improvement in the WBV group ($p=0.046$) and exercise group ($p=0.004$) but not in control ($p=0.664$). The BBS score showed significant time effect ($p<0.001$) but the time × group interaction was not significant ($p=0.168$). No significant time effect ($p=0.257$) or time × group interaction ($p=0.967$) was found for the TUG. Conclusions: The strength and balance training program improved lower limb strength better than controls. Adding WBV conferred no additional benefits. Improvement in balance was also observed but was similar across the 3 groups. The results indicated the improvement in strength and balance. However, it did not lead to improvement in gait speed and walking tolerance.