Pedometry and 'peer support' in older Chinese adults: a 12-month cluster randomised controlled trial

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KEY MESSAGES

1. Use of pedometers and motivation from friends significantly increased physical activity and fitness levels in older subjects.
2. ese interventions significantly improved psychosocial parameters, but had minimal e ects on vascular risk factors.
3. Further work is needed to find alternative or additional means to modify the behaviour of approximately 50% of subjects who did not increase their physical activity levels.

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Abstract

ere is a need to increase physical activity to attenuate age-related morbidity. is 12-month factorial design cluster trial randomised 399 volunteers from 24 centres to buddy peer support, pedometry, or control group. Data were anaysed using last-observation carried-forward and intention-to-treat methods. Compared to the controls, participants in the pedometry group increased their levels of physical activity energy expenditure significantly, as did those in the buddy group. As recorded by the International Physical Activity Questionnaire [IPAQ], the respective increases amounted to 1820 (95% confidence interval [CI], 1360-2290) and 1260 (95% CI, 780-17 460) metabolic equivalent of task (MET).min.wk^{-1}. e buddy group also had significantly improved aerobic fitness after adjustment for body weight (12%; 95% CI, 4-21%), but this did not attain significance in the pedometry group (7%; 95% CI, -1 to 15%). Our results suggest that recourse to pedometers and the buddy peer support system is simple means of increasing physical activity in older subjects.

Introduction

Population ageing is associated with a high burden of physical and mental problems, which have major social and economic consequences. Epidemiological and clinical intervention studies have shown the benefits of exercise on health.[1-4] However, high levels of inactivity were noted in Hong Kong (over 30-40% in the older population).[3,5-7] In a population-based study in 1995, 25% of elderly (aged 65-74 years) Hong Kong subjects had type-2 diabetes, 53% had hypertension, and 64% had dyslipidaemia.[5,6] Physical activity programmes that improve weight loss and related metabolic parameters have shown benefits in terms of clinically relevant surrogate markers of health.[1,8-11]

Population-based exercise intervention studies should be simple, cheap, and of low maintenance.[1] Formation of small peer support groups and provision of pedometers as motivational tools are two examples. is report provides a summary of a study assessing the usefulness of these interventions in improving physical activity and fitness in an older Chinese population.

Methods

is 12-month cluster randomised controlled study aimed to evaluate the e ects of providing a pedometer, and participation in a 'buddy-style' peer support programme on physical fitness and activity and cardiovascular risk factors (anthropometry and blood pressure). e main outcome measures were changes in physical activity measured by the IPAQ[12] and fitness levels. It conformed with the Declaration of Helsinki and was approved by the University of Hong Kong's Ethics Committee. All participants were given opportunities to ask questions regarding the study and gave written informed consent. e study was registered with the University of Hong Kong Clinical Trials Register.

e IPAQ had been validated in the local

population.[12,13] Anthropometric, socioeconomic, lifestyle details, personal and family medical histories were recorded. A submaximal Astrand cycle exercise test was used to assess aerobic fitness in a subgroup of 226 (56.6%) capable subjects. A number of standard tests were performed to assess physical ability. A get-up-and-go test (time taken for the subject to get up from a chair walk 2.5 m, round a marker and return) and a 30-second chair stand test (number of times a person can stand and sit in 30 seconds) were used to measure lower body strength, whereas a 30-second arm curl test (number of arm curls in 30 seconds) was used to measure arm strength.[14] Two maximal e ort isometric lower body strength (hip flexion, knee extension) tests were also performed.

ere were 412 eligible volunteers identified from 24 community centres for older persons, which provide social and recreational day services for its members. e participants recruited from these

Compared to the controls, participants in the buddy group significantly increased their levels of physical activity energy expenditure by 1260 (95% CI, 780-17 460) MET.min.wk^{-1} (Table). e improvements in physical activity paralleled with positive changes in aerobic fitness after adjusting for body weight (12%; 95% CI, 4-21%). However, these significant changes only resulted in a small reduction in percentage body fat (-0.6%; 95% CI, -1.1 to -0.0%), with a significant reduction in the duration required to complete the 2.5-m get-up-and-go (-0.3 s; 95% CI, -0.05 to -0.0 s). e combination of motivational tools was no better than the individual interventions.

Discussion

In the older Hong Kong Chinese population, both the pedometry and buddy peer support interventions significantly increased the mean amount of physical activity. e latter intervention also improved aerobic fitness levels. Despite this, there were only limited improvements in the cardiovascular risk factors, with only the buddy group showing reduced body fat and time required to complete the 2.5-m get-up-and-go test. is is likely due to only a small proportion (7-8%) reaching the activity target, with about half showing a positive increase in activity levels. In part this may have been due to relatively high baseline activity levels to start with. Even the low and medium activity groups were achieving a mean of 7405 (95% CI, 6736-8140) steps.d^{-1} and the high activity group a mean of 9806 (95% CI, 8915-10 787) steps.d^{-1}. For persons aged >60 years, these levels of daily step counts appear high by international standards, where 6500 is considered common,[16] with 53% (the low/moderate fit) of our Hong Kong subjects averaging nearly 1000 more than this, and 48% in the high activity group achieving over 3000 more. However, these results were consistent with other studies,[17,18] and was likely due to the 'very high walkability' in the Hong Kong environment.[19]

Few studies have reported the impact of changes in physical activity as measured by the IPAQ on anthropometric measures and related vascular risk factors.[20] Such changes in exercise level measured by other instruments are associated with attenuation of age-related decline in many physical and psychological functions.[2,11,21,22] Meta-analyses evaluating the e ects of physical activity or fitness on vascular disease involving 2.5 million person-years of observation have shown a clear inverse dose-response relationship between physical activity or fitness and vascular disease risk; active or fit subjects reduce their vascular disease risk by 30 to 50%, compared to corresponding sedentary or unfit persons.[2,10] is suggests that the increase in physical activity in both our pedometry and buddy groups as well as improved aerobic fitness in the buddy group may have a significant long-term beneficial impact on both all-cause and vascular disease mortality. However, given the lack of a significant improvement in the cardiovascular disease risk factors, larger studies, perhaps with additional risk factors or endpoints are necessary to confirm this assumption.

Recourse to pedometers and the buddy peer support system is a simple means of increasing physical activity in older subjects and targeting obesity and age-related complications. Further research is needed to find alternative or additional means to modify the behaviour of the approximately 50% of the subjects who did not increase their physical activity levels. e reproducibility and long-term maintenance of the improvements in these surrogate risk factors and their subsequent impact on vascular disease morbidity and mortality should also be assessed.

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