

Breath, Balance, and Belonging: A Holistic Approach to Preventing Falls in Later Life

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Introduction

With an ageing population, promoting physical and respiratory health in older adults is increasingly important. This project investigates a novel intervention combining Inspiratory Muscle Training (IMT) with dance-based exercise to support healthy ageing. Age-related loss of muscle strength, including respiratory muscles, can lead to reduced mobility, balance issues, and decreased quality of life. While both IMT and physical activity are known to be beneficial individually, their combined effects have not been widely studied.

This 8-week intervention involves older adults participating in weekly dance sessions alongside IMT. The aim is to assess changes in balance, functional mobility, respiratory function, and participants' experiences through both quantitative and qualitative methods.

By focusing on a community-based, accessible form of exercise, this study offers a holistic approach that addresses both the physical and social aspects of ageing. Findings from this research will help determine the feasibility of this combined intervention and may inform future strategies to enhance the independence and wellbeing of older adults.



Figure 1 - Representation of the dance classes.

With increasing life expectancy, supporting older adults to maintain their physical function, independence, and quality of life is vital. This study explores an innovative intervention combining Inspiratory Muscle Training (IMT) and dance-based exercise to improve balance, mobility, respiratory function, and overall wellbeing. While both components have shown individual benefits in previous studies, their combined effect has not yet been thoroughly explored in a community-based context.

Inspiratory Muscle Training (IMT) is a simple, home-based intervention that targets the muscles involved in breathing. Using a handheld pressure-threshold device (e.g. POWERbreathe Plus), participants perform daily breathing exercises that strengthen the diaphragm and other inspiratory muscles. In this study, participants in the experimental group will perform 30 fast breaths twice a day at 50% of their maximal inspiratory pressure, with adjustments based on tolerance. A endurance IMT group will perform slower breaths at a lower intensity for comparison. IMT has been associated with improvements in respiratory strength, balance, and exercise capacity in older populations.

The dance-based intervention consists of weekly group classes led by dance practitioners. Each 60-minute session is designed to be inclusive and accessible, focusing on movement, rhythm, coordination, and breath awareness. The sessions aim to promote not only physical activity but also enjoyment, relaxation, and social connection. The classes incorporate warm-up, guided creative explorations, and cooldown phases, and conclude with informal group discussions to encourage reflection and community building. This approach allows participants to benefit physically, mentally, and socially from the intervention. By combining these two approaches, the project seeks to develop a multimodal, holistic intervention for healthy ageing that can be scaled for broader public health impact.

Aim: To investigate the effect of a combined inspiratory muscle training (IMT) and dance-based intervention on balance, functional mobility, respiratory function, and overall wellbeing in older adults.

Methods

This study will use a mixed-methods design to assess the impact of a combined inspiratory muscle training (IMT) and dance-based intervention in older adults. A total of 30 participants, aged 60 years and above, will be recruited from the local community and gyms. Participants will be randomly assigned to one of two groups: Dance + IMT (intervention group); Dance + endurance IMT (control group). The intervention will run for 8 weeks. Both groups will take part in weekly 60-minute dance classes, delivered by experienced instructors, focusing on breath awareness, movement coordination, and relaxation. Sessions will follow a standardised format and include post-class discussions to promote reflection and social engagement. IMT will be performed at home using a POWERbreathe Plus device. The intervention group will complete 30 fast breaths twice daily at 50% of baseline maximal inspiratory pressure (MIP), with progressive load adjustment. The endurance group will perform 60 slow breaths once daily at 15% MIP, without adjustments. Outcome measures will be collected before and after the intervention, including: Balance (Mini-BESTest), Functional mobility (30-second sit-to-stand test, 6-minute walk test) Respiratory function (MIP, FVC, FEV1), Quality of life (EQ-5D-5L), Physical activity (PASE questionnaire), Balance confidence (ABC Scale), Disability (Oswestry Disability Index), Cognitive screening (MMSE).

In addition, qualitative data will be gathered through focus groups with a small number of participants, exploring their experiences of the intervention. Sessions will be recorded, transcribed, and analysed thematically using NVivo.

Ethical approval has been sought from the University of Derby ethics committee. The intervention is considered low-risk and suitable for community-based delivery.

