

Running head: Tai Chi to prevent falls among older people

## The case for Tai Chi in the repertoire of strategies to prevent falls among older people

Dr Samuel R. Nyman, BSc, MSc, PhD\*

Department of Psychology and Bournemouth University Dementia Institute, Faculty of Science and Technology, Bournemouth University, Poole House, Talbot Campus, Poole, Dorset, BH12 5BB, UK, Tel: 01202 968179, [snyman@bournemouth.ac.uk](mailto:snyman@bournemouth.ac.uk).

Professor Dawn A. Skelton, BSc, PhD, M.D.h.c

School of Health and Life Sciences, Institute for Applied Health Research, Glasgow Caledonian University, Centre for Living, A101g Govan Mbeki Building, Cowcaddens Road, Glasgow, G4 0BA, UK, Tel: 0141 331 8792, [Dawn.skelton@gcu.ac.uk](mailto:Dawn.skelton@gcu.ac.uk)

\* To whom correspondence should be addressed.

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### Declarations of conflict of interest

Dawn Skelton is a Director of Later Life Training Ltd, a not for profit run company that delivers training to health and fitness professionals in the delivery of evidence based exercise programmes to prevent falls.

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*Falls among older people is a global public health issue. In this article, Dr Samuel Nyman of Bournemouth University Dementia Institute, and Professor Dawn Skelton, Institute for Applied Health Research, Glasgow Caledonian University highlight the effectiveness of Tai Chi as an alternative strategy to physiotherapy to combat this issue.*

Falls among older people is a major public health issue worldwide [1]. Several strategies to prevent falls are at the disposal of practitioners and policy makers. Exercise-based interventions in particular have strong evidence for preventing falls and fall-related injuries [1]. Two exercise-based strategies to prevent falls in wide use are the FaME [2] and Otago [3] programmes that are predominantly class-based and home-based respectively.

However, Tai Chi is another exercise programme to be included in the repertoire of strategies to prevent falls and is also recommended in the CDC Compendium of Interventions [4]. Tai Chi is an ancient Chinese form of mind-body exercise, where people carry out smooth, fluid movements either for health or as a martial art [e.g. 5]. Below we highlight five reasons to support the case for greater promotion of Tai Chi amongst other widely-used exercise-based strategies for the prevention of falls among older people:

*Tai Chi may be as effective or more effective than other exercise-based strategies for preventing falls among older people who are not frail*

There are few studies that directly compare the efficacy of exercise-based interventions on fall outcomes. For Tai Chi, a Korean trial randomised older women to either Tai Chi or Otago and found both to improve physiological measures associated with fall risk [6]. Further, a Canadian randomised controlled trial compared the effect of Tai Chi with conventional

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physiotherapy among frail community-dwelling older adults [7]. They found that Tai Chi was significantly superior in reducing the incidence of falls compared with physiotherapy (rate ratio = 0.74, 95% CI = 0.56, 0.98), which the authors attributed to sustained general self-efficacy amongst those in the Tai Chi group compared with diminished general self-efficacy in the physiotherapy group [8]. While not conclusive, these two studies suggest that Tai Chi can be effective or more effective than other exercise-based strategies to prevent falls.

However, when Tai Chi is adapted for use with frailer older people (e.g. by using more static or seated movements, rather than the traditional flowing three-dimensional movements), it appears to no longer prevent falls. Frailer adults would then need alternative exercise programmes that have been shown to be more effective amongst this group [2;3;9].

*Tai Chi may be as cost-effective or more cost-effective to deliver than other fall prevention strategies*

A cost-benefit analysis was conducted to compare the costs associated with different fall prevention interventions [10]. Tai Chi was found to have the largest return on investment (over 500%), far higher than the next best intervention for return on investment (127% for Otago for those aged 80+), with a net benefit of over \$500 dollars per \$1 dollar invested.

While there are few studies that directly compare the cost-effectiveness of different fall prevention interventions, this analysis suggests that Tai Chi may be cost-effective compared with other strategies to prevent falls among older people.

*Tai Chi may receive higher uptake and adherence rates than other exercise-based interventions to prevent falls*

Unlike prescribed / physiotherapy-based exercise interventions, Tai Chi is a form of physical activity that is widely practised among the general population of all ages and abilities. This

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means that participating in Tai Chi would be perceived as a ‘normal’ activity [11]. Given that older people tend to not identify themselves as a ‘faller’, and therefore do not perceive themselves to have a need to participate in fall prevention interventions [12], through normalisation, Tai Chi may be a more widely-acceptable fall prevention strategy. While this hypothesis remains to be tested, it does mean that Tai Chi is an alternative strategy for practitioners trying to engage older people in fall prevention behaviours.

*One size won't fit all; we need to offer older people a choice of strategies to engage with to prevent falls*

It is acknowledged that Tai Chi will not be of interest to all older people, just as FaME and Otago programmes will not be of interest to all older people. Therefore, a range of fall prevention strategies are required to meet the diverse interests of older people, as well as a repertoire of exercise programmes including Tai Chi to meet the range of abilities among older people (i.e. frail vs. not frail) [9].

*Tai Chi may be as effective or more effective in preventing falls among older people with dementia*

Trials in the falls prevention literature have unfortunately tended to exclude older people with dementia until recently. Tai Chi may be a particularly useful strategy to use with people living with dementia; it is well suited for this patient group, given its use of slow, gentle, and repetitive movements [13]. A UK trial will be testing the efficacy of such an approach with community-dwelling people with dementia [14].

*How does Tai Chi prevent falls?*

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While there may be more than one mechanism by which Tai Chi prevents falls, we hypothesise that the main mechanism is through an improvement in postural stability [5]. This is evidenced by the results from an American trial that found Tai Chi improved functional balance by the end of a six-month intervention, and that these improvements in balance predicted a reduction in the rate of falls in the Tai Chi group by the six-month post-intervention follow-up [15]. Functional balance may be improved during Tai Chi through its use of patterns and footwork, leading to an increased ability to retain postural stability under challenging conditions, increased reaction speed to correct one's posture during perturbed movement or general improvements in physiological (e.g. metabolism) and psychological functioning (e.g. reduced stress), via an increased facilitation of chi (flow of energy) throughout the body [e.g. 5]. While research behind mechanisms of balance control continue, it is clear that Tai Chi prevents falls at least among community-dwelling older people who are not frail [1], and has a clear case for its inclusion in the repertoire of interventions to prevent falls among older people.

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