Developing and validating a localised, self-training mindfulness programme for older Singaporean adults: effects on cognitive functioning and implications for healthcare

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ABSTRACT There is a paucity of research available on the effect of mindfulness on cognitive function. However, the topic has recently gained more attention due to the ageing population in Singapore, catalysed by recent findings on brain function and cellular ageing. Recognising the potential benefits of practising mindfulness, we aimed to develop a localised, self-training mindfulness programme, guided by expert practitioners and usability testing, for older Singaporean adults. This was followed by a pilot study to examine the potential cognitive benefits and feasibility of this self-training programme for the cognitive function of older adults in Singapore. We found that the results from the pilot study were suggestive but inconclusive, and thus, merit further investigation.

Keywords: ageing, cognition, mindfulness, pilot study

INTRODUCTION

If age-related mental decline could be delayed or prevented, the ramifications for healthcare for the ageing population would be tremendous. The latest research suggests that mindfulness may hold this potential.¹⁻⁵ Mindfulness was popularised by Dr Jon Kabat-Zinn from the University of Massachusetts Medical School, Massachusetts, United States, who defined it as the practice of purposefully paying attention in the present moment while being non-judgemental.⁶⁻⁷ Unlike conventional cognitive training approaches, which require effortful control targeted at training specific brain networks, mindfulness training is general attentional state training, with skills that are transferable to cognition and socio-emotional behaviours.⁸ Many studies have supported the beneficial effects of mindfulness-based interventions on health and psychological functioning, including stress, depression and anxiety.⁹⁻¹⁵ On the other hand, research on the cognitive effects of mindfulness has only recently begun to draw more attention. This is partly catalysed by increasing population ageing and recent findings on the effects of mindfulness in preserving brain function and cellular ageing.¹¹⁻¹³,¹⁶⁻¹⁷

Although research on the cognitive effects of mindfulness is relatively recent and scarce, emerging data has indicated its potential. Studies have found that increased attention, defined as the ability to focus while ignoring other irrelevant information,¹⁸ through the practice of mindfulness was able to enhance working memory.¹⁹,²⁰ This is due to the reciprocal connections between attention and working memory²¹ as well as better emotional regulation and the inhibition of secondary elaboration of thoughts.¹⁹,²²⁻²⁵ Working memory is a limited-capacity system, where information is temporarily stored and manipulated.²⁶ An improvement in sustained attention following mindfulness-based stress reduction was found in some studies, but not in others.²²⁻²⁹ Other studies have also reported the potential effects of mindfulness on inhibitory control (i.e. the ability to override more dominant or automatic responses), cognitive flexibility (the ability to switch between tasks or sets of rules, also referred to as attentional switching)²³⁻²⁷,¹⁰⁻¹¹ and speed of processing (the speed at which a person performs a cognitive activity),²²⁻³⁴ despite other contradictory findings.³⁵ However, the mixed results could reflect methodological, training or sample differences.³⁶

In recognition of the potential benefits that mindfulness could bring to the ageing population, we aimed to develop a localised, self-training programme for older Singaporean adults to make mindfulness more widely available to those who would otherwise not be able to access traditional face-to-face classroom training due to various constraints. The localised, self-training programme (in DVD format) was adapted from the standard mindfulness programme to suit older adults by having a shorter training duration and simplified guided instructions (in English and Chinese). For example, Mrazek et al adopted a two-week mindfulness training programme in their study, while Zeidan et al shortened it further to four days.¹⁹,²² Both studies, which reported beneficial effects for cognition (including working memory), were performed on university students, hence limiting its generalisability to older adults. In the current project, material development was guided by input from mindfulness experts and refined after usability tests. The content included body scanning (i.e. guiding one’s attentional focus to different parts of the body), mindful breathing, stretching and mindful sitting.³⁷⁻³⁸

We herein describe our pilot study that examined the efficacy of the self-training mindfulness programme specifically for cognitive function in older adults. This study was conceived in cognisance
of the limited research on mindfulness, including: (a) the effects of mindfulness on cognition; (b) the feasibility of a self-training mindfulness programme; (c) the viability of a shorter training duration; (d) its applicability to local context; and (e) the ageing population. To the best of our knowledge, this pilot study is one of the first to investigate a self-training mindfulness programme.

METHODS
We recruited 30 participants (English- or Mandarin-speaking) who were aged ≥ 55 years. A total of 23 participants who met the eligibility criteria (Mini-Mental State Examination score > 25 and Geriatric Depression Scale score < 5) were eventually included in the study. 13 of the participants were from a senior activity centre and ten were from a database of research participants. Participants were assigned to the experimental group or active control group based on a randomised block design using an online research randomiser. Before testing, participants’ baseline performance for the cognitive outcome measures (Table I) was assessed.

During the two-week intervention, the experimental group practised mindfulness exercises following the guided DVD programme for about 20 minutes per day, five days per week, while the active control group watched an educational video series on the history of kungfu. Participants from the Centre for Ageing Studies database did the training at home using the DVD, with a training log to monitor their training compliance. The participants recruited from the senior activity centre, who had healthy function, did the same training at the centre following the assigned DVD programme, with experimenters present to set up the audio-visual equipment, record training attendance and provide minimal prompts. After testing, participants underwent the same cognitive assessments.

RESULTS AND DISCUSSION
At baseline, there were no significant differences between the experimental and active control groups for both demographic variables (years of education: experimental 5.00 ± 4.00 vs. control 7.18 ± 5.60, p = 0.29; and age: experimental 72.92 ± 9.37 vs. control 72.45 ± 9.32, p = 0.91) and cognitive performance (Table II).

Taken together, there was an overall improvement in the mindfulness and executive functions of the participants. Nonetheless, the improvement in the training group was not significantly greater than in the control group (p = 0.34). In order to conduct a manipulation check, we included the Mindful Attention Awareness Scale to measure the level of mindfulness of participants before and after training; the results suggested a general improvement. Although the training group improved as hypothesised following the mindfulness programme, the improvement was not significantly greater than that of the active control group. This could be due to the limitations of the self-report method, which a significant proportion of participants had some difficulty understanding. Investigators had to explain the method to these participants in their own dialects. This is a recognised challenge for the current cohort of older adults in Singapore who are illiterate or not highly educated. It is also probable that the study was not sufficiently powered. Nonetheless, the overall improvement in mindfulness was in line with the aim of the training.

Furthermore, this study found that the effects of the localised, self-training mindfulness programme differentially impacted participants depending on the training mode. Notably, centre-based participants in the mindfulness group exhibited significant improvement (p = 0.007) in episodic memory as compared to the active control group (p = 0.501) (Fig. 1). It was also noted that home-based participants with a higher educational level generally outperformed centre-based participants. Thus, the margin to capture improvement could be greater for centre-based participants (i.e. they started at a lower baseline performance), which reflects that those with a greater range for improvement would benefit most from this programme.

CONCLUSION
Mindfulness is recognised as a promising, low-cost and non-invasive intervention that can potentially buffer against cognitive decline or impairment.10,11 This pilot study has partially shown that short-term gains from mindfulness training are possible, which is consistent with studies from Mrazek et al and Zeidan et al.19,22 Nonetheless, future studies are needed to determine the long-term impact of consistent mindfulness training over a longer period of time. More empirical evidence is needed from the nascent but
burgeoning research on the effects of mindfulness on cognition. The present study is an attempt to answer this need. It makes an incremental contribution to the field as a pilot study to show the feasibility and potential cognitive benefits of a self-training mindfulness programme that merits further investigation on a larger scale. Future research can explore other training formats, including mobile applications, to propagate mindfulness training.

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