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Objective benefits, participant perceptions and retention rates of a New Zealand community-based, older-adult exercise programme

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ABSTRACT

INTRODUCTION: Most exercise studies for older adults have been university- or hospital-based. Little is known about the benefits and factors influencing long-term participation in community-based exercise programmes, especially in New Zealand.

AIM: To quantify the objective benefits, participant perceptions and retention rates of a New Zealand community-based exercise programme for adults (60 years or older).

METHODS: Study 1 involved assessing the benefits of 12 weeks' training on a convenience sample of 62 older adults commencing the never2old Active Ageing programme. Study 2 assessed the perceptions of 150 current participants on a variety of programme components that could act as barriers or facilitators to continued engagement. Study 3 assessed the retention rates of 264 participants in the programme over a two-year period.

RESULTS: Significant improvements in many physical functional scores were observed in Study 1 (5–30 percentile points; $p < 0.05$). Questionnaire responses from participants in Study 2 indicated many perceived benefits (positive responses from 67–95% on various questions) and that core components of the programme were rated very highly (64–99% on various components). Retention rates were high, with Study 3 finding 57% of participants still engaging in the programme at the end of the two-year period.

DISCUSSION: A community-based exercise programme for older adults can improve many objective and subjective measures of physical fitness and functional performance and have good retention rates. General practitioners and other allied health professionals in New Zealand should consider promoting programmes, such as the never2old Active Ageing programme, to their older patients.

KEYWORDS: Exercise; muscle stretching exercises; older adults; primary health care; resistance training

Introduction

Much research has demonstrated the benefits of exercise for older adults.^{1–3} However, most of these studies have been conducted in hospital or university settings, with relatively few involving existing community-based exercise programmes. While a number of international studies have demonstrated a range of significant functional, health and wellbeing effects of community-based exercise programmes for older adults,^{4–6} little data is available in New Zealand.

New Zealand-based researchers have developed and evaluated a number of effective older-adult community-based exercise programmes—for example, the Otago Exercise Programme⁷ and the Green Prescription.⁸ While these programmes have many benefits for their target populations, they are not necessarily group-based. This is important, as many older adults prefer group activities because they provide opportunities for socialisation in addition to the reported physical benefits.^{9,10} Further limitations of these two New Zealand-based older-adult exercise programmes

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are that neither has a strong emphasis on progressive resistance training, and the Otago Exercise Programme is targeted to pre-frail and frail individuals with a history of falls. Resistance training is now understood to be the key exercise form for maintaining muscle mass, strength and physical function in older adults,¹¹⁻¹³ and along with balance training could be the most important mode of exercise for older adults wishing to retain their functional ability and to reduce falls risk.¹⁴ Unfortunately, the proportion of older adults who regularly perform resistance training is only approximately 10–15%.^{15,16}

One of the issues that Winnett and colleagues¹⁵ highlight as contributing to the low prevalence of resistance training in older adults is a lack of understanding of the factors that influence adherence and retention rates to this form of training. Quantitative research^{17,18} and qualitative research^{10,19} approaches have been considered to improve our understanding, but regardless of the barriers and facilitators older adults may experience, if they don't perceive substantial benefits from the programme, they are unlikely to continue performing resistance training for any length of time.²⁰⁻²² Therefore, the primary aim of the current study was to determine the potential objective and subjective benefits of the never2old Active Ageing programme, a community-wide group-based programme currently offered in 18 fitness centres throughout Auckland, New Zealand. The secondary aim was to gain some insight into the members' perception of differing aspects of the programme and to provide some data on the programme's retention rates. It was hypothesised that:

1. there would be many significant objective and subjective benefits of participation
2. there would be varying opinions of different aspects of the programme, and
3. the programme would exhibit relatively good retention rates.

Methods

Design

The data presented in this paper consists of three sub-studies. Study 1 examined the objective

WHAT GAP THIS FILLS

What we already know: Many older adults may be at risk for chronic health conditions, falls and poor mental health due to their reduced physical fitness and functional performance. Structured group-based exercise, involving a resistance training and balance component, may increase muscular strength, reduce falls risk and consequently improve day-to-day functional abilities.

What this study adds: This study demonstrates many objective and subjective benefits of a community-based older-adult exercise programme that is widely available in Auckland, New Zealand. Primary care practitioners are in an ideal position to counsel their older patients to join group-based programmes, such as the never2old Active Ageing programme, in an attempt to improve their physical fitness and functional performance and reduce falls risk.

changes in functional performance after the first 12 weeks of participation in the never2old Active Ageing programme. Study 2 used a survey to examine current participants' perceptions about the benefits of the never2old Active Ageing programme. Study 3 used attendance records to quantify the retention rates to the programme over a two-year period, the length of attendance and the primary reason cited for those discontinuing the programme. At the time of these studies, 12 fitness centres offered the never2old Active Ageing programme.

Participants

All participants in the never2old Active Ageing programme completed a modified Physical Activity Readiness questionnaire (PAR-Q) prior to starting the programme and being included in this study. If the answers to any of the PAR-Q questions raised any concern, medical clearance was required prior to entry into the programme. As a community-based programme, there was no specific inclusion/exclusion criteria for these studies, besides being 60 years or older and being healthy enough to be given medical clearance to participate in the programme. All participants gave written informed consent to participate in these studies. Ethical approval for the studies was given by the Auckland University of Technology Human Ethics Committee.

Training programme

Although primarily an exercise programme, the never2old Active Ageing programme has a

holistic, multi-modal approach to improving the fitness, health and wellbeing of older adults. The programme provides regular exercise classes, as well as the opportunity to attend educational seminars, modified sports days and outdoor adventure opportunities called 'Young at Heart Outdoor Opportunities' (YAHOO) challenges. In order to ensure sustainable behaviour change, the members are supported through a focus on life-long learning, social networking opportunities, increasing functional performance and independence, and psychological, emotional and spiritual wellbeing.

The exercise performed as a part of the never2old Active Ageing programme is group-based and involves resistance, balance, cardiovascular and flexibility training activities aimed at improving older adults' overall functional performance, health and wellbeing. Training sessions lasted 60 minutes in duration and were undertaken twice weekly for 12 weeks. All sessions were supervised and were progressive in nature, whereby the difficulty of the exercises and the magnitude of training loads were gradually increased over time. Although the programme is continually evolving, during the conduct of this study all never2old Active Ageing programme members started with the introductory-level 'Bronze programme'. The Bronze programme was utilised by all participants in Study 1, as it aimed to build confidence, improve base levels of strength and movement control, develop good habits in training and establish good exercise form. It primarily involved resistance and cardiovascular exercises, with all resistance training being bilateral, predominantly seated/supported machine-based activity performed at moderately low intensity. After completing a 5–10 minute warm-up, participants would perform a set of exercises (knee extension, leg curl, leg press, chest press, lat pulldown, shoulder press, bicep curl and tricep pushdown) for 1–2 sets of 8–12 repetitions, with loads that initially produced moderately light to moderate ratings on the Borg rating of perceived exertion (RPE) scale.²³ Thereafter, 5–10 minutes of cardiovascular exercise (stationary cycling or walking on a treadmill) was performed at a moderately light to moderate intensity on the Borg RPE scale.²³ This was followed by 5–10

minutes of stretches for most major muscle groups as part of a 'cool-down'.

The majority of the members assessed in Studies 2 and 3 were longer-term participants and were therefore performing the intermediate (Silver) or advanced (Gold or Platinum) level programmes. The Silver, Gold and Platinum level programmes were more challenging in terms of the exercise prescription and were characterised by higher intensity, a greater use of unilateral and multi-joint exercises, free-weights (dumbbells and barbells), reduced body support and increased balance requirements.

While all participants of the never2old Active Ageing programme were strongly encouraged to attend the classes for two sessions a week, as a community programme the participants could choose any weekly frequency of exercise they wished.

Study procedures

Study 1

The never2old Active Ageing programme is aligned with the International Coalition of Aging and Physical Activity (ICAPA) and consequently used the ICAPA's recommended Seniors Fitness Test.^{24,25} This series of assessments has been shown to have validity and reliability in predicting functional performance ability in older adults and involves the performance of the following six tests:

1. 30-sec sit-to-stand test
2. 30-sec bicep curl test
3. chair sit-and-reach test
4. back-scratch test
5. 8-ft up-and-go test, and
6. 6-minute walk test.^{25,26}

The chair sit-and-reach, and back-scratch tests examine the flexibility of the lower and upper body, respectively.^{25,26} The 8-ft up-and-go test and the 6-minute walk test assess dynamic balance/mobility and walking endurance, respectively. All of these Senior Fitness Tests were conducted within the same assessment session that lasted approximately one hour. Prior to

performing these six assessments, all participants completed a 5–10 minute warm-up consisting of general total body movements and stretches of the primary muscle groups, and all participants were given the same instructions. These instructions were to do the best they could do on the tests but never to push themselves to the point of overexertion or beyond what they thought was safe for them.²⁶

Study 2

A three-page questionnaire involving questions based on previous research²⁷ was used to obtain participants' perceptions on the benefits of the never2old Active Ageing programme and their views on various ('core' or 'wider') aspects of the programme that may act as barriers or facilitators to programme adherence. These questions used a 5-point Likert scale. Specifically, questions relating to the potential benefits of the programme and views on core components of the programme were graded as follows:

- 1 = strongly agree
- 2 = agree
- 3 = neutral
- 4 = disagree, and
- 5 = strongly disagree.

Questions on the wider aspects of the additional programme components were scored as follows:

- 1 = excellent
- 2 = very good
- 3 = good
- 4 = poor
- 5 = very poor, or
- NA = not applicable.

Study 3

Using attendance records, the 264 older adults in Study 3 were classified as current attendees or non-attendees, with current attendees defined as averaging at least one class a week over the previous three months. Based on attendance records, the length of programme participation (to the closest month) was also determined. To gain some insight into factors underlying discontinuation of the programme, all non-attendees were contacted

by the programme staff and asked the primary reason they had stopped attending.

Data analysis

For Study 1, where multiple trials of several Senior Fitness Test assessments were performed, the best score for each participant was used for data analysis. Data for the female and male participants were reported separately, so that gender-specific comparisons could be performed. This involved expressing each gender group's mean results as an approximate percentile, using the age- and gender-matched normative data from Rikli and Jones.²⁵

For Study 2, the percentage of respondents to each of the potential answers was calculated. To facilitate interpretation, all 'strongly agree', 'agree' or 'excellent', 'very good' and 'good' responses were grouped together to demonstrate the magnitude of the combined perceived positive response.

For Study 3, the percentage of current attendees and non-attendees was calculated. For the current attendees, the duration of attendance was determined as being: less than 1 year, 1–2 years, or greater than 2 years. For non-current attendees, the primary reason for discontinuing the programme was noted and similar responses collated under themes related to the primary barriers to physical activity in older adults.²⁸

Statistical analysis

For Study 1, data were presented as a mean and standard deviation separately for females and males at the pre- and post-test sessions. Changes in performance for each gender group were assessed using the unequal variance paired *t*-test with significance set at $p < 0.05$.

Results

A description of the demographic characteristics of the participants in each of the three studies is provided in Table 1. On enrolling in the programme, the majority of participants self-reported being sedentary or somewhat active and having at least one chronic condition. The three

Table 1. Demographic characteristics of the participants involved in Studies 1, 2 and 3

	Study 1	Study 2	Study 3
Number of participants	62	153	264
Females/males	43/19	97/53	172/92
Age (years)*	71 ± 6	72 ± 7	72 ± 4
Body mass (kg)*	76 ± 18	NA	NA
Height (cm)*	166 ± 9	NA	NA
BMI (kg/m ²)*	27 ± 5	NA	NA
Programme participation			
<6 months	100%	51%	67%
6–12 months	0%	8%	8%
12–24 months	0%	19%	21%
>24 months	0%	22%	4%
Fitness centres involved	5	7	7

NA Not available

BMI Body mass index

* Data is mean ± SD

most common conditions were high blood pressure (17%), arthritis and other joint conditions (16%), and cardiovascular disease (12%).

A total of 62, 150 and 264 members of the never2old Active Ageing exercise programme partici-

pated in Study 1, 2 and 3, respectively. The 62 participants in Study 1 represented the new members of the programme who consented to participate over the recruitment period of four months. The 264 participants in Study 3 were those who had attended one or more never2old Active Ageing classes in any of the seven consenting fitness centres (of the 12 offering the programme) during 2007–2008. The 150 participants in Study 2 were individuals still attending the never2old Active Ageing programme in one of the seven consenting fitness centres at the end of 2008.

Forty-five percent of the overall sample of 62 older adults in Study 1 completed all 24 training sessions. Mean attendance in the programme was 22 ± 2 out of 24 sessions, meaning an overall attendance rate of 92%. No significant difference in attendance rates were observed between the male and female participants. Changes in the functional fitness test scores for female and male participants are presented in Table 2. Older females and males both significantly improved their performance on the 30-sec sit-to-stand, 30-sec bicep curl, 8-ft up-and-go, and 6-min walk

Table 2. Change in functional fitness test scores and percentiles in female (n=43) and male (n=19) never2old Active Ageing programme participants

Test*	Pre-test score [†]	Post-test score [†]	p-value	Pre-test percentile	Post-test percentile	Change in percentile
Females						
Sit-to-stand (repetitions)	15.1 ± 4.2	16.3 ± 3.2 [‡]	0.023	65	75	+10
Bicep curls (repetitions)	16.5 ± 3.5	18.0 ± 4.4 [§]	0.012	60	75	+15
Sit-and-reach (cm)	3.4 ± 6.6	4.1 ± 8.3	0.469	40	45	+5
Back-scratch (cm)	-5.1 ± 6.9	-4.7 ± 7.1	0.503	40	45	+5
8-ft up-and-go (s)	4.79 ± 0.95	4.49 ± 0.81 [‡]	0.035	75	80	+5
6-min walk (m)	529 ± 62	558 ± 61 [§]	<0.001	55	65	+10
Males						
Sit-to-stand (repetitions)	14.7 ± 4.4	18.0 ± 5.2 [§]	<0.001	50	80	+30
Bicep curl (repetitions)	17.4 ± 4.0	19.6 ± 4.1 [§]	<0.001	50	70	+20
Sit-and-reach (cm)	-0.2 ± 10.5	3.5 ± 10.2 [‡]	0.014	50	60	+10
Back-scratch (cm)	-11.5 ± 10.6	-10.6 ± 11.3	0.159	50	50	0
8-ft up-and-go (s)	4.80 ± 1.69	4.35 ± 1.38 [‡]	0.025	65	75	+10
6-min walk (m)	526 ± 103	566 ± 123 [§]	<0.001	35	50	+15

* Functional fitness assessment tests were as outlined in the Seniors Fitness Test^{23,24} and used normative data derived for that test

† All data is mean ± SD

‡ p<0.05

§ p<0.01

Table 3. Perceived benefits resulting from continual attendance of the never2old Active Ageing programme (n=150)*

Question	Strongly agree	Agree	Neutral	Disagree
My fitness and overall sense of wellbeing has improved through participation in the programme	42%	53%	5%	
My ability to perform daily functional tasks such as rising from a chair, stair climbing and walking have improved through involvement in the programme	34%	48%	17%	
The programme has definitely helped improve my balance and I feel greater movement control and less fear of falling than I did prior to exercising	27%	40%	32%	2%

* Note: All percentages may not necessarily add to 100% due to the rounding of values to the nearest whole number. No participants gave a 'Strongly disagree' response to any of these three questions

tests. Males also significantly improved their performance in the sit-and-reach test. Neither group showed any significant improvement in the back-scratch test results.

The perceived benefits reported by the 150 members in Study 2 from regularly attending never2old Active Ageing classes are summarised in Table 3. It was observed that the majority (combination of 'strongly agree' and 'agree' responses) of the 150 participants felt the programme was beneficial in improving their fitness and overall wellbeing (95%), ability to perform functional

tasks (82%), and overall balance and reduced fear of falling (67%).

The 150 participants' ratings of various core exercise components of the never2old Active Ageing exercise programme are presented in Table 4. The majority (combination of 'strongly agree' and 'agree') of the 150 participants felt that the overall never2old Active Ageing programme experience was positive (99%), that the staff were knowledgeable, helpful and motivating (99%), that they were supported regardless of their level of function or capabilities (94%), that the instruc-

Table 4. Participants' (n=150) ratings of various core components of the never2old Active Ageing exercise programme*

Question	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
My overall never2old exercise programme experience has been very positive	70%	29%	1%		
The four levels of programming (Bronze, Silver, Gold and Platinum) keep me motivated and moving towards improved levels of performance	25%	39%	26%	8%	2%
The staff associated with the programme are knowledgeable, helpful and motivate me to be more active	69%	30%	1%		
The instructors understand my individual health/fitness needs and assist me accordingly	41%	43%	14%	1%	
I am supported and encouraged to participate in the class regardless of my fitness level, physical disabilities and capabilities	62%	32%	5%	1%	

* Note: All percentages may not necessarily add to 100% due to the rounding of values to the nearest whole number

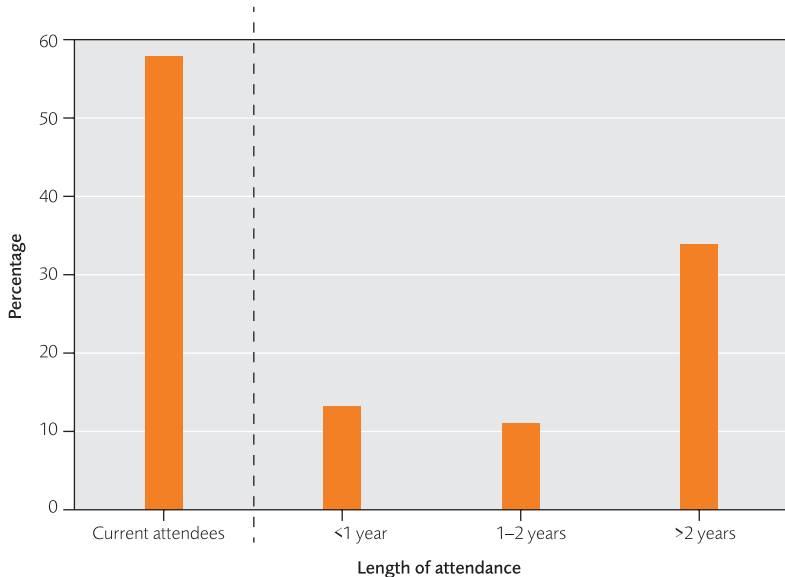
Table 5. Participants (n=150) ratings of various additional components of the never2old Active Ageing programme*

Additional component	Excellent	Very good	Good	Poor	Very poor	Not applicable
Modified sports days	12%	17%	11%	0%	1%	59%
Outdoor (YAHOO) challenges	18%	10%	10%	0%	1%	60%
Seminars	26%	12%	8%	0%	2%	53%

YAHOO Young at Heart Outdoor Opportunities

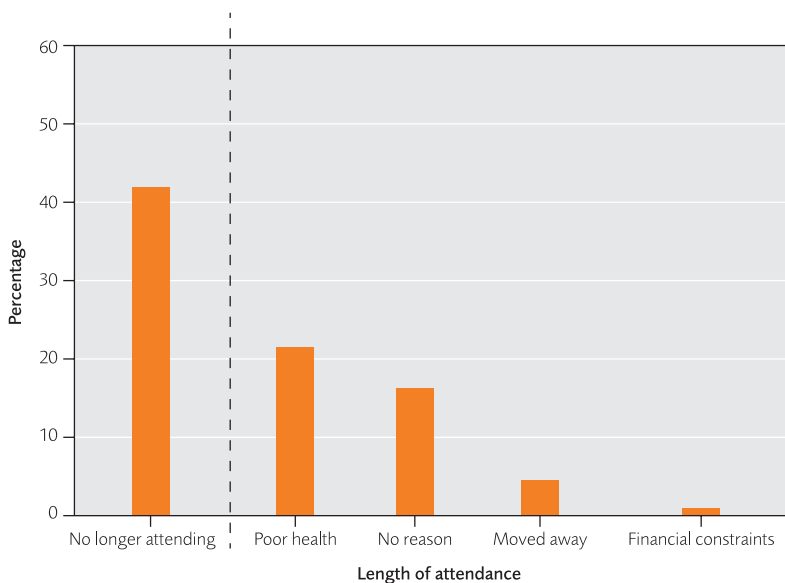
* Note: All percentages may not necessarily add to 100% due to the rounding of values to the nearest whole number

Figure 1. Percentage of the 264 never2old Active Ageing programme participants (Study 3) who have continued to attend the programme over a two-year period (2007–2008)*



* The column to the left of the dashed line indicates the percentage of those who continue to attend, while the columns to the right of the dashed line indicate the length of their attendance

Figure 2. Percentage of the 264 never2old Active Ageing programme participants (Study 3) who have stopped attending the programme over a two-year period (2007–2008)*



* The column to the left of the dashed line indicates the percentage of those who stopped attending, while the columns to the right of the dashed line indicate the participant's primary cited reason for discontinuing

tors understood their individual needs (84%), and that the four levels of the programme were motivational and beneficial (64%).

The views of the 150 members on a variety of additional aspects of the never2old Active Ageing programme are described in Table 5. Modified sports days, outdoor challenges and seminars were rated positively ('excellent', 'very good' or 'good') by only 38–46% of the participants, with 53–60% of the group giving a 'not applicable' response.

Fifty-seven percent of the 264 participants in Study 3 were still attending the never2old Active Ageing programme on a weekly basis at the end of 2008 (after two years), with 34% having attended for more than two years (see Figure 1). Of the 43% who were no longer attending on a weekly basis at the end of 2008, the primary reason cited for discontinuing was poor health (21%; see Figure 2).

Discussion

The results presented in this paper on the never2old Active Ageing programme add to the emerging literature on the benefits of community-based exercise/active ageing programmes for older adults. Both the older female and male subjects significantly improved their performance in the sit-to-stand, bicep curl, 8-ft up-and-go, and 6-min walk tests after performing two never2old Active Ageing sessions per week for a total of 12 weeks. These results appear consistent with other international studies that used the Senior Fitness Test with community-based older-adult exercise programmes.^{4,29,30} Although no control group was utilised in the present study, these improvements appeared to be of clinical and practical significance. For example, the percentile changes for the bicep curl test, sit-to-stand test and 6-minute walk test were in the order of +10–15% for females and +15–30% for males.²⁵ The changes in the 6-minute walk test for males and females also exceeded the designated 'small meaningful change' of 18 m³¹ and 'minimally clinically important difference' (MCID) of 20 m,³² with the males approaching the substantial meaningful change of 49 m.³² The improvements for

the males in sit-to-stand test performance also exceeded the MCID of two repetitions.³³

While the significant improvements in a number of the Senior Fitness Test components were anticipated, it was also important to get the participants' perspectives of the programme's benefits. Of the 150 never2old Active Ageing attendees who participated in Study 2, 95% felt the programme improved their fitness and overall wellbeing, 82% that the programme increased their ability to perform functional tasks, and 67% that their balance was improved and fear of falling reduced. These high rates of perceived benefits for a programme involving a substantial resistance training component would appear somewhat similar to previous findings.^{17,19}

The remaining questions in Study 2 focused on how the attendees liked or disliked various core and additional aspects of their overall programme experience. The highly positive responses to four of the five questions ($\geq 84\%$ positive) on the core programme components suggest that the members valued the exercise prescription and felt that the instructors were meeting their needs. Somewhat similar findings were obtained by other researchers^{17,19} who investigated the factors predicting adherence in similar-aged 'older exercisers'. In comparison, most (53–60%) of the members reported that the additional components of the programme such as modified sports days, outdoor adventure opportunities and seminars were not relevant. Given the rate of negative responses to these questions was very low (1–2%), the relatively low positive responses (38–46%) suggest that these additional programme components were not the primary reasons for continuing attendance.

Results of Study 3 revealed that 57% were still actively participating in the programme at the end of the two-year follow-up phase, with 34% attending the programme for over two years. These retention rates appear greater than that reported for younger and middle-aged adults in regular fitness centre settings,³⁴ and better or comparable to other studies involving older adults.^{17,35} Such comparatively high retention rates for the programme may reflect the high level of perceived benefits and satisfaction with the core components seen in Study 2.^{17,19} Specifically,

these results suggest that community-dwelling older adults are more likely to continue to attend a group exercise class if it has a positive culture about older adults and exercise, and if the instructors have good interpersonal skills and older adult-specific exercise prescription knowledge.

We acknowledge several potential limitations to these pilot studies. These include the relatively small sample sizes compared to many international studies and the lack of involvement of five of the 12 centres who were offering the programme at the time of the study. Further, as Study 1 was performed after Study 2, no participants in Study 1 were included in Study 2's survey. As a community-based programme, there was also the relative lack of time commitment of the staff to the administration of the data collection process, meaning some relevant variables may not have been collected or entered into the database for all participants.

In conclusion, the never2old Active Ageing multi-component exercise programme has shown many positive objective and subjective functional effects on the fitness and wellbeing of community-dwelling older adults and good retention rates. Additional studies in this area are needed to further examine longer-term (greater than 12 months) adherence and retention rates to the never2old Active Ageing programme or other community-based older adult exercise programmes, as well as to identify the factors that are associated with older adults initiating and adhering to these programmes. Such information will allow practitioners to better accommodate the health, wellness and quality-of-life concerns of older adults through prescription of appropriately structured and administered older adult-specific exercise programmes.

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