

# A pilot program of physical activity promotion among clients receiving home and community care

Melainie Cameron, Natalie Chahine, Steve Selig and Pam Newton

## Abstract

Three Victorian local governments cooperated in a pilot study of physical activity promotion as part of home and community care (HACC) service delivery. Thirty-one people receiving HACC volunteered to participate, including completing the Transtheoretical Stages of Change Exercise Questionnaire and the short-form Stanford Health Assessment Questionnaire (HAQ) just before and at 3 months and 6 months after starting regular self-selected physical activity. Twenty-one participants returned questionnaires at 3 months, and 17 participants returned questionnaires at 6 months. Data were analysed using paired *t* tests and effect sizes were calculated as mean differences. At 3 months, mean improvements were identified on 6 of the 8 HAQ-DI (disability index) subscales, and in the overall HAQ-DI score. Improvement in dressing and grooming was preserved at 6 months. At either 3 or 6 months, improvements in dressing and grooming, reach, hygiene, and daily activities, and overall HAQ-DI score exceeded the minimum clinically important difference. No improvements were statistically significant, as is likely in a pilot study with a small sample, however, these results suggest that even very small increases in physical activity may afford clinically meaningful improvements in some areas of physical function required for independent living.

**Melainie Cameron**, PhD, Senior Lecturer  
**Steve Selig**, PhD, Professor  
 Human Movement, Recreation and Performance, Victoria University, Melbourne, VIC.

**Natalie Chahine**, MAppSc, Exercise Physiologist  
 Western Region Health Centre, Melbourne, VIC.

**Pam Newton**, MBA, Aged and Disability Services Manager  
 Shire of Melton, Melton, VIC.

Correspondence: Dr Melainie Cameron, Human Movement, Recreation and Performance, Victoria University, PO Box 14428, Footscray, Melbourne, VIC 8001.

[melainie.cameron@vu.edu.au](mailto:melainie.cameron@vu.edu.au)

## What is known about the topic?

Physical activity is associated with improvements in physical function, mental health, social function, and overall perceptions of health and wellbeing.

## What does this paper add?

This paper describes a study of physical activity among home and community care clients who chose programs that they agreed to follow for 6 months.

## What are the implications for practitioners?

The results suggest that client-selected increases in physical activity may provide clinically meaningful improvements in some areas of physical function required for independent living and Home and Community Care workers are encouraged to assist and support clients in their aspirations to be more physically active.

Australian Clinical Trials Registry registration number: ACTRN012606000242527.

**Aust Health Rev 2008; 32(3): 439–450**

HOSPITAL AND INSTITUTIONAL care of elderly adults is a considerable financial burden on Western societies, particularly for the observation and ongoing management of chronic disease. Home and community care (HACC) is an alternative approach to providing ongoing care of semi-dependent people not in need of acute interventions. In most HACC programs, clients remain living in their own homes and receive regular visits from workers who may attend to the clients' personal care (eg, washing, dressing, feeding, showering) or household needs (eg, cleaning, dusting, ironing, laundry). Some HACC programs also include the provision of nursing or domiciliary medical care.

In the three local government areas Brimbank, Maribyrnong, and Melton to the west of Melbourne, Australia, home care is available for

people who are impaired in their ability to undertake domestic duties (cooking, laundry, domestic cleaning). Home care workers are also trained to undertake personal care,<sup>1</sup> providing assistance with “bathing, dressing, grooming, toileting . . . getting in and out of bed . . . mobility and eating” (p. 93). Home and personal care services are provided in clients’ homes by home care workers employed by the local government. People who request home care have their domestic care requirements determined by assessment officers, also employed by local government. Assessment officers also monitor clients’ home care needs through routine follow-up checks.

Although the job description of a home care worker<sup>1</sup> includes a work duty “to provide assistance with prescribed exercise or therapy programs” (p. 94), home care workers and assessment officers practice a relatively passive care model in which home care is delivered to clients with little requirement for client involvement. Home care workers attend clients’ homes. Clients are not responsible for developing, planning, or contributing to home care. In many local government areas, clients pay little or nothing for home care services. A drawback of this passive care model is that functionally limited clients may have their physical capacity further reduced through dependence on other people. A further criticism is that passive interventions such as home and personal care may reinforce behaviour patterns of dependency and learned helplessness in clients. These warnings are particularly valid when working with clients who, because they experience chronic illness, seek home care assistance over many years.

Most chronic diseases increase with increasing age. Also, elderly adults are at greater risk of comorbidities than their younger counterparts. Even without comorbid disease, longevity leads to greater expenditure because usual annual health care costs are incurred more times over a person’s life. Health care of elderly people is particularly expensive; a recent estimate is that up to 10% of a person’s total health care costs are incurred during the final year of life.<sup>2</sup> Aged care is a health budget priority for Western governments with ageing populations.

The benefits of regular physical activity are numerous and well documented. Physical activity is associated with improvements in physical function, mental health, social function, and overall perceptions of health and wellbeing. Even older people with physical limitations or existing health problems are not exempt from the physical-related benefits of exercise.<sup>3,4</sup> Keysor,<sup>4</sup> on the basis of a review of recent clinical trials, reported that “exercise — particularly walking — increases muscle strength and aerobic capacity and reduces functional limitations.” (p. 129). Regardless of age or illness, people who do resistance training become stronger,<sup>5</sup> and people who do aerobic exercise on a regular basis improve their cardiorespiratory capacity.<sup>6</sup>

Similarly, the relationship between exercise (physical activity) and psychological health has been widely researched and well documented.<sup>7</sup> Regular physical activity is associated with improvement in key markers of psychological wellbeing and health-related quality of life, including mood, self-perception, health perception, and self-efficacy,<sup>8</sup> anxiety, depression, and subjective wellbeing.<sup>9</sup> The exact processes by which exercise promotes changes in psychological wellbeing and quality of life are uncertain, but the value of exercise for enhancing both mental and physical health is well supported.

Conversely, physical inactivity leads to substantial negative effects on health, including muscle weakness, atrophy, and fatigue. Leading a sedentary life may compound the loss of quality of life associated with chronic illness. Inactivity is well correlated with depressed mood, reduced sociability, and a decline in wellbeing.<sup>9</sup>

Changing health behaviour, either adopting positive health behaviour such as physical activity, or stopping negative health behaviour such as cigarette smoking, is a complex process.<sup>10,11</sup> One of the most widely used models for explaining the process of changing health behaviour is the Trans-theoretical Model of Behaviour Change. In this model, moving from a sedentary lifestyle to a lifestyle inclusive of regular physical activity is marked by stages described as pre-contemplation, contemplation, preparation, action, and mainte-

nance.<sup>12-14</sup> The names of these stages are self-explanatory: a person in pre-contemplation has not begun to think about doing any physical activity, a person in the preparation stage has begun to make plans for physical activity, and a person in maintenance is physically active on a regular basis.<sup>13</sup>

Measuring health-related quality of life longitudinally is central to describing the effects of disease, ageing, and interventions. Quality of life measures are increasingly used as indicators of effectiveness in clinical trials. Although health-related quality of life outcome measures do not offer an explanation as to the mechanism of therapeutic action, they can provide broad-based measures of physical, mental, and social aspects of individuals' lives before, during, and after an intervention.<sup>15</sup> These types of measures are useful when, as in this project, researchers are interested in measuring change over time and participant follow-up, and when sociological or humanistic views of health are preferred.

A test of statistical significance is the usual process to compare treatment outcomes (efficacy) in health research. Conclusions regarding efficacy may be misleading if drawn solely from tests of statistical significance.<sup>16</sup> In studies with small sample sizes, differences between intervention and control groups, or in individuals over time, may not be statistically significant due to low statistical power, yet such differences may be clinically important.<sup>17</sup> Because the meaning of improvement is subjective,<sup>18</sup> small changes may be important to individuals. The reader is better able to make a judgement of the practical importance of an intervention, statistically significant or not, if the effect size is also reported.<sup>19</sup> Almost 20 years ago Kazis, Anderson and Meenan<sup>20</sup> argued in favour of the systematic reporting of effect sizes, but their recommendation has been largely unheeded. Tests of significance are ingrained in health research, and are unlikely to be abandoned. Statistical significance has many determinants, including sample size, variability, directional hypotheses and range restrictions. Whether statistical significance is achieved also varies according to the sensitivity of the measures

used to determine responses to interventions. In this study estimates of significance are presented along with indicators of effect size (mean differences) as combined tools for judging whether an intervention is effective, and a discussion of the clinical meaningfulness of effect sizes is included.

Exercise and physical activity are known to be health promoting, and physical inactivity is known to be associated with a substantial cost and disease burden. It is expected that people receiving HACC services are likely to be physically inactive. These people are frail or elderly, and are already somewhat physically impaired in that they cannot perform all of their own home care and self care tasks. In this research we explored whether HACC clients, who expressed interest in exercise, self-selected activities that made meaningful differences to their physical function, quality of life, and orientation to a more physically active lifestyle over 6 months.

## Methods

This project was part of a series of pilot programs to explore the usefulness of an active service model in the delivery of HACC services. Active service differs from the typical passive service delivery because capacity building or restorative care approaches are adopted with the aim of enhancing or maintaining clients' capacity to live independently. Three Victorian local government areas (Cities of Brimbank and Maribyrnong, and the Shire of Melton), the Victorian State government Department of Human Services, and Victoria University Exercise Rehabilitation Unit combined resources to develop an active service model in which promotion of regular physical activity formed part of home and community care (HACC) service delivery. Aims of this project were to assess: (a) the uptake of new exercise/physical activity among people receiving active service model home care; (b) the adherence to exercise/physical activity over time by people receiving active service model home care; and (c) the health and wellbeing effects of exercise/physical activity among people receiving active service model home care.

## **Participants**

Thirty-one people receiving HACC services volunteered to enter the study. All participants were adults previously assessed as somewhat impaired in their ability to undertake personal or home care tasks.

## **Measures**

Participants completed the Transtheoretical Stages of Change Exercise Questionnaire,<sup>21</sup> and the short-form Stanford Health Assessment Questionnaire (HAQ)<sup>22</sup> just before, then 3 months and 6 months after the commencement of physical activity. Both these measures return some numerical data and some categorical data.

The Transtheoretical Stages of Change Exercise Questionnaire (continuous version) is a 24-item pencil-and-paper self-report measure of an individual's beliefs about and motivation towards planned exercise/physical activity. It is a point-in-time measure suited for repeated administrations to assess change over time. Participants respond to each of the 24-item statements with a numerical score ranging between 1 (strongly agree) and 5 (strongly disagree). The 24-items cluster corresponding to each of the stages of behaviour change. Scores for each stage are summed, and a respondent's current stage of behaviour change is reported as the stage for which he/she returned the highest score.

The HAQ was one of the first health-related quality of life instruments. Although developed for use in research among people with rheumatoid arthritis,<sup>22</sup> it is based on generic, client-centred dimensions.<sup>23</sup> The HAQ has been validated for use as a measure of health-related quality of life in people with chronic illnesses and for monitoring changes in health status in elderly adults.<sup>24</sup> The short-form of the HAQ comprises: (a) a disability subscale covering 8 domains (dressing and grooming, arising, eating, walking, hygiene, reach, grip, daily activities) and returning an overall disability score; (b) a visual analogue pain scale that is a 15-cm horizontal line anchored "no pain" to "severe pain"; and (c) a visual analogue global health scale that is also a 15-cm horizontal line anchored "very well" to

"very poor".<sup>25</sup> On each of these subscales, lower scores indicate better health-related quality of life. The global health scale returns numerical data that are closely correlated with "feeling thermometer" and, therefore, may be interpreted categorically. The disability subscale of the HAQ (HAQ-DI) has been used previously in state government and local government health research, consequently the HAQ was selected by the government partners as the preferred health-related quality of life measure for this project.

## **Procedures**

Before data collection, 24 home care workers and 3 assessment officers volunteered to participate in training to help them identify physical activity need among people receiving HACC. Assessment officers and home care workers were trained by staff of the Victoria University Exercise Rehabilitation Unit (VUER) to identify HACC clients' physical activity needs, and, through discussion with clients, to plan, implement and support clients doing some regular physical activity. The job description of a home care worker<sup>1</sup> includes a work duty to:

provide assistance with prescribed exercise or therapy programs ... This assistance can be provided on a consumer-specific, non-transferable skills basis. Personal care workers must not be taught a standard set of exercises or a therapy program to use across the HACC target groups as this is outside the scope of a personal care worker's role. (p. 94)

Training provided by VUER prepared home care workers to undertake this part of their role. During the training program, we (MC, NC, SS) emphasised that among HACC clients, physical activity should be adapted to the needs of the individual, accounting for age, functional capacity, health, and personal interests.

Following this training, HACC workers and assessors identified clients likely to be interested in participating in this project. Invitations to participate, project information, consent forms and reply-paid envelopes were sent to potential

participants from their respective local governments. Potential participants were informed of the method, risks, and likely benefits of the project; assured that regardless of participation in this project, they would continue to receive existing home care services; and informed of what data would be collected and how these data would be used. Participation in this project was voluntary. HACC clients who wished to take part returned completed informed consent forms directly to one of the researchers (M C) at Victoria University.

During the project, assessment officers and home care workers interacted with clients with much the same frequency as in the previous care model. As well as assessing home care requirements, assessment officers identified clients' physical activity needs and opportunities.

People who volunteered to receive home care under this model were asked to complete a battery of pencil-and-paper questionnaires at the beginning, middle, and end of the 6-month trial. Using these questionnaires, the researchers sought information about clients' motivations toward physical activity, physical activity uptake, the continuation of physical activity over time (adherence), and any health-related quality of life effects (physical function, mental wellbeing, social function) of physical activity. Questionnaires were mailed to participants, and returned directly to the researchers using reply-paid envelopes.

Completed questionnaires and associated data were kept confidential and were not available to the home care workers, assessment officers, municipal councils, or the state government during the project. Following completion of the project, some de-identified data (HAQ-DI subscale scores) were released to the local and state governments to allow evaluation of the active service model.

Because home care is service for people who are physically limited, the physical activities suggested in this project were non-competitive and tailored to clients' personal needs and abilities. Generic, standardised exercise programs were not delivered in this project and clients identified their own physical activity needs that they (a) wanted to

undertake, and (b) felt they could undertake with the supervision or assistance of home care workers. Personalised physical activity plans were developed for all participants. Participants agreed to take part in some regular physical activity for 6 months. During this time, home care workers encouraged, monitored, and, where necessary, supervised participants during exercise. An accredited exercise physiologist (allied health practitioner) was available throughout the project to support clients, home care workers, and assessment officers in the development and implementation of exercise/physical activity plans.

This project was registered as a clinical trial with the Australian Clinical Trials Registry (registration number ACTRN012606000242527). The Victoria University Human Research Ethics Committee approved this project protocol.

### **Data analysis**

All participants served as their own controls. The selected questionnaire measures returned continuous numerical or categorical data. Categorical data were analysed descriptively. Numerical data were analysed using paired *t* tests (0–3 months, and 0–6 months) for each variable. Effect sizes were calculated as mean differences. Improvements were compared with the minimum clinically important differences required for each measure. In this study, statistical significance may be less meaningful than clinically important differences, but for the sake of completeness, significance testing was conducted using paired *t* tests with data from baseline and 6 months at a pre-determined alpha level of 0.05.

## **Results**

### **Return rates and participation**

Thirty-one people receiving HACC services volunteered to enter the study; fifteen people lived in the City of Brimbank, ten people in the Shire of Melton, and seven people in the City of Maribyrnong. At the commencement of the project all 31 participants developed physical activity plans for moderate, regular, incremented physical activity

### I Stages of change for each participant at each data collection point

Participant	Baseline	3 mths	6 mths	Trend
B1	A	M	-	Improvement
B10	C	A/M	M	Improvement
B11	C	C	C	Stable
B12	M	M	M	Stable
B13	C	-	-	Stable
B14	PCN	C/A	-	Improvement
B15	C	-	-	Stable
B2	M	M	A/M	Stable
B3	C	-	-	Stable
B4	C	-	-	Stable
B5	C	A/M	A/M	Improvement
B6	M	C	M	Stable
B7	C	P/C	A/M	Improvement
B8	C	-	-	Stable
B9	A	-	-	Stable
M1	A	P/C	-	Decline
M10	C	A	M	Improvement
M2	C	C	C	Stable
M3	C	C	C	Stable
M4	C	A	A	Improvement
M6	A	P	-	Decline
M7	C	-	-	Stable
M8	A	A	M	Improvement
M9	A/M	A/M	A	Stable
MY1	M	M	-	Stable
MY2	PCN	PCB	-	Improvement
MY3	M	-	-	Stable
MY4	M	M	-	Stable
MY5	C	P/A	-	Improvement
MY6	M	M	-	Stable
MY7	C	P/A	-	Improvement

PCN = pre-contemplation (non-believer). PCB = pre-contemplation (believer). C = contemplation. P = preparation. A = action. M = maintenance. Dashes represent missing data. Forward slash between two categories indicates that the participant returned equal scores for both subscales.

that: (a) were of their own choice; (b) could be undertaken with little or no cost to them; and (c) used existing resources available in the home or community. Twenty-one participants returned questionnaires at 3 months (return rate 68%), and 17 participants returned questionnaires at 6 months (return rate 55%). These return rates are acceptable in social research.<sup>26</sup> Unless a participant reported otherwise, returning completed questionnaires was assumed to indicate ongoing participation in the intended physical activity.

Physical activity plans were individualised and variable across the course of the study. Typically, participants selected activities of low cost that were locally accessible, including tai chi and chair-based exercises at home, walking in the house, yard, or local streets, and community group exercise programs.

### **Withdrawals, non-returns, and data replacement**

Because the intervention required a 6-month commitment from participants, and the sample comprised elderly people whose health was expected to decline over time, withdrawals from this project were expected. Only four participants formally withdrew from the study. Although there was no requirement to do so, these participants provided explanations as to why they withdrew from the project, citing reasons including admission to hospital, and being already involved in another physical activity project. For participants who did not return one or more questionnaires, data for omitted time points were replaced with scores from the time point immediately prior.

### **Injuries and injury risk**

All physical activity carries a risk of injury. When physical activity is carefully planned and closely monitored, physical injury risks are minimised. In this project, the risks of injury were minimised through: (a) the training of home care workers and assessment officers; and (b) the continuous oversight of an accredited exercise physiologist over the physical activities. Regardless of this risk minimisation, two HACC workers and one assessor sustained minor physical activity-related inju-

## 2 Global health status classification for each participant at each data collection point

Participant	Baseline	3 mths	6 mths	Trend
B1	Fair	Fair	–	Stable
B10	Fair	Good	Fair	Stable
B11	Fair	–	–	Stable
B12	Good	Good	Very good	Improvement
B13	Fair	–	Omitted	Stable
B14	Good	Good	–	Stable
B15	Poor	–	–	Stable
B2	Poor	Fair	Poor	Stable
B3	Poor	–	–	Stable
B4	Fair	–	Omitted	Stable
B5	Fair	Good	Fair	Stable
B6	Poor	Poor	Fair	Improvement
B7	Poor	Poor	Poor	Stable
B8	Fair	–	Omitted	Stable
B9	Poor	–	–	Stable
M10	Good	Fair	Good	Stable
M2	Good	Fair	Good	Stable
M3	Fair	Good	Good	Improvement
M4	Fair	Good	Fair	Stable
M6	Omitted	Fair	Fair	Stable
M7	Good	–	–	Stable
M8	Excellent	Excellent	Very good	Decline
M9	Good	Good	Good	Stable
M1	Good	Fair	Fair	Decline
MY1	Very good	Very good	–	Stable
MY2	Poor	–	Poor	Stable
MY3	Good	–	–	Stable
MY4	Fair	Omitted	–	Stable
MY5	Fair	Good	–	Improvement
MY6	Good	Good	–	Stable
MY7	Fair	Fair	–	Stable

ries (sprains/strains) during the training stage of the project. During a focus group discussion at the end of the project, one of the HACC workers commented, and the other staff members agreed,

that sustaining an injury during the training was helpful because it alerted her to the “limitations” of her body and made her circumspect about not pushing her clients beyond their limits.

No participants reported injury associated with the physical activity plans implemented during the clinical trial stage of project, however, it must be considered that participants may have withdrawn from the project due to injury and not reported these reasons to the researchers.

### Stages of change

Each participant’s stage of exercise behaviour change at each data collection point is reported in Box 1. These data are categorised into three trends: improvement, stability, and decline. Eleven participants reported forward progression through at least one stage of behaviour change towards more physically active lifestyles. Of the participants who improved, four participants progressed through two or more stages of behaviour change. Eighteen participants reported no change in stage of behaviour over the life of the project, or did not return data at some points, and were classified as stable in their orientation toward exercise and physical activity. Of these participants, eight participants reported no change from stages of behaviour consistent with undertaking regular physical activity (ie, action or maintenance). Declined orientation to exercise was identified in two participants who reported backward movement through at least one stage of behaviour change.

### HAQ pain

Across the study participants reported low pain scores. The greatest individual pain score at any time point was 2.6/15. Mean pain scores at baseline, 3 months and 6 months were 0.97/15, 0.59/15, and 0.84/15, respectively. Modal pain scores at baseline and 3 months were 0/15. The 6-month data included two modes: 0/15 and 0.7/15. These low, non-normally distributed pain scores represent a floor effect on this sub-scale and likely indicate that pain was not a key feature of health-related quality of life among these participants. These data were not subject to further analysis.

### 3 Mean differences from baseline in the Health Assessment Questionnaire disability sub-scale (HAQ-DI), and overall scores at 3 and 6 months

Domain	Per-protocol: 3 mths	Per-protocol: 6 mths	Missing data replaced: 3 mths	Missing data replaced: 6 mths
Dressing/grooming	0.150	0.222	0.097	0.097
Arising	-0.100	-0.333	-0.065	-0.097
Eating	0.200	-0.222	0.129	-0.129
Walking	-0.150	-0.111	-0.097	-0.129
Hygiene	0.526	-0.222	0.323	-0.065
Reach	0.526	-0.111	0.323	0.129
Grip	0.053	-0.444	0.032	-0.226
Daily activities	0.526	-0.278	0.323	-0.097
Overall HAQ-DI score	0.223	-0.188	0.133	-0.065

Positive mean difference indicates improvement in health-related quality of life. Minimum clinically important difference is 0.22.<sup>25</sup>

#### HAQ global health

Participants' categorical assessments of global health status at each data collection point are reported in Box 2. These data also categorise into three trends; improvement, stability, and decline. Most participants reported stable health status over the life of the project. Health status improvement was reported by four participants and health status decline was reported by two participants. Some participants did not return data at some points, either not returning the questionnaire or omitting the global health status subscale. Among these participants, health status was assumed to be stable over time.

#### HAQ-DI

Per-protocol analysis of the 3-month data identified mean improvements on six of the eight HAQ-DI subscales; dressing and grooming, eating, hygiene, reach, grip, and daily activities; and in the overall HAQ-DI score. Only improvement in

dressing and grooming was preserved at 6 months. Dependent *t* tests showed none of these improvements to be statistically significant at an alpha level of 0.05, however, 3-month improvements on the daily activities subscale approached significance ( $P = 0.066$ ).

The data are somewhat non-normally distributed with standard deviations of some difference scores exceeding mean differences and should be interpreted with caution. Regardless, at either 3 or 6 months improvements in dressing and grooming, reach, hygiene, and daily activities subscales, and in the overall HAQ-DI score exceeded the minimum clinically important difference (0.22) required to demonstrate improvement.<sup>25</sup> Mean differences on each domain at each time point are reported in Box 3.

Further analyses were conducted to estimate the improvements and effect sizes if there had been no withdrawal from the project. To conduct these analyses, missing data for all 31 participants were replaced by individuals' data from the preceding time points. In adopting this method, we assumed no change in the participants who withdrew from the study. Analysis of the 3-month data identified mean improvements on six of the eight HAQ-DI subscales; dressing and grooming, eating, hygiene, reach, grip, and daily activities; and in the overall HAQ-DI score. Improvements in dressing and grooming and reach were preserved at 6 months, although the magnitude of the improvement in reach was less than that observed at 3 months.

Repetition of the analyses using this intention-to-treat model did not alter either the power or statistical significance of the results, and is probably of limited usefulness in interpretation of the results. Further, we acknowledge that the assumption of no change over time may be a flawed assumption in this group of participants, whose health may be expected to decline over time.

#### Discussion

In this study we demonstrate that incremental, client-selected, increases in physical activity can lead to small, yet meaningful, improvements in

health-related quality of life. These results are exciting, and have implications for semi-dependent adults and their carers.

### **Uptake of physical activity**

An unusual aspect of this project is that we did not record the amount of physical activity undertaken by each participant over time. Rather than asking participants to keep exercise diaries, we relied on participants' reports that they actually engaged in the physical activities as they had planned. All participants who remained in the study until completion ( $n = 17$ ) are understood to have continued with physical activity for the 6-month period. Not keeping physical activity diaries may be considered a weakness of the study, but is probably immaterial. Misreporting of physical activity levels is possible regardless of the selected reporting mechanism.

Changing health behaviour is a difficult, multi-stage process.<sup>10,27</sup> The likelihood of a person commencing and continuing with regular physical activity is strongly correlated with thoughts and feelings about exercise, known as the stage of behaviour change.<sup>12,28</sup> We recorded clients' self-reported orientation to exercise using a stage of change questionnaire, and noted that 11 participants reported forward progression through at least one stage towards more physically active lifestyles, and another eight participants reported no change from stages of behaviour consistent with undertaking regular physical activity (ie, action or maintenance). These 19 people are the participants most likely to continue with regular physical activity beyond the term of the project.

### **Supporting ongoing physical activity**

Because participants planned their physical activities in consultation with home care workers, with oversight from allied health practitioners if necessary, participants became accountable to their home care workers. Home care workers expressed interest in clients' levels of physical activity and provided attention and support to motivate clients to continue with physical activity throughout the project. Also, home care workers attended clients' homes regularly throughout the

project, and were able to observe clients engaging in physical activity.

Studies from counselling psychology indicate "the quality of the counseling relationship has proved to be the most significant factor in facilitating treatment adherence and positive counseling outcomes."<sup>29</sup> (p. 344). The working alliance is the collaborative relationship between the client and the therapist, working together to improve the functioning (health) of the client. The quality of the working alliance influences outcomes, partly because a strong working alliance is an important factor in a client persisting with an intervention through a plateau or setback. We contend that home care workers are very well placed to build strong working alliances with clients, to act in therapeutic ways to support clients through difficulties and to encourage clients to persist with physical activity.

### **Withdrawal from physical activity**

Given the nature of the intervention (adopting a positive health behaviour) and the nature of the sample (elderly people whose health is expected to decline over time), withdrawals from the project and non-return of questionnaires were neither surprising nor excessive. In our statistical analyses we assumed that participants who withdrew from the study or did not return questionnaires remained stable in their health status (as measured by the HAQ) and readiness to exercise (ie, stage of change). These assumptions may have been flawed. People who are frail and impaired such that they required home or personal care at the start of the study are likely to have chronic illnesses and comorbidities that may be expected to worsen over the 6 months of intervention. Follow-up investigation is planned to further explore reasons for withdrawal among the people who did not complete the study.

### **Meaningful improvements**

The design of this project was somewhat unusual among exercise studies because we collected no physical measures of fitness, strength, or endurance. We argued that measures of physical fitness, such as isokinetic testing of muscle strength, and

walk, step, or bicycle tests of lung function, were likely to be of less meaning to home care clients than measures of daily household and personal care functions. Consistent with Kaplan's "Ziggy theorem," we decided that "the meaning of life is *Doin' stuff*".<sup>30</sup> We considered that clients who chose to live in their own homes and receive home care, rather than move into assisted accommodation, would view the physical functions required for independent living as particularly important. These functions; the ability to reach for and grasp items, bathe, dress and clothe oneself, attend to personal hygiene and toileting, walk, and transfer from bed, chair or floor; are captured in the HAQ. The effect sizes identified on these key domains of health-related quality of life are small and not statistically significant, but where the effect sizes exceed the minimum clinically important difference or persist over time, they are probably real effects. It is worth remembering that small benefits may be meaningful if the dependent variable is particularly important. Small but genuine improvements in areas of personal importance may be truly meaningful for clients.

### **Self-efficacy**

Several authors have proposed that improvements in self-efficacy may explain many of the functional gains associated with exercise.<sup>8,31,32</sup> Essentially, if an exercise program involves climbing stairs, then as participants undertake that activity, their confidence in their ability to do that activity (ie, self-efficacy) improves. It is not surprising that at the end of an exercise intervention, participants have improved capacity to do the activities for which they have trained.

In this project we did not investigate whether clients' confidence with any specific physical activities increased over time, although anecdotally, clients described increases in self-efficacy.\* One participant recounted that her physical activ-

ity plan was to walk, and her long-term goal was to walk her rather energetic dog. At first, she walked to and from her letterbox under the watchful eye of a homecare worker, then she progressed to walking around the block in the company of her granddaughter, who walked the dog. By the end of the 6-month project, the client reported that she walked her dog around the block.

### **Is it enough?**

For the most part, clients in this project planned and engaged in physical activity at levels well below recommendations in the Australian National Physical Activity Guidelines<sup>33</sup> or advocated by the American College of Sports Medicine.<sup>34</sup> These low levels of physical activity are likely to provoke the question "Is it enough?" from people who understand the importance of regular exercise. We maintain that promoting even small increases in physical activity is probably worthwhile, and although we cannot be certain that the interventions undertaken in this project were "enough," we take comfort from observing clinically meaningful effects in response to even very small increases in participants' physical activity. Our perspective and results are supported by recent studies reporting some health benefits from low-intensity activity in vulnerable, usually sedentary, populations.<sup>35,36</sup>

### **Unexplored aspects of health-related quality of life**

The HAQ used in this study, although a reliable, valid, and widely used measure of health status, is somewhat incomplete. Some important, but rarely discussed, domains of health-related quality of life are not explored using this measure. For example, the HAQ does not include a mental health or mood state subscale. Several researchers have suggested that the beneficial effects of exercise reach further than functional gains to improved mental health.<sup>4,32</sup> Lee and Park<sup>37</sup> investigated the relationship between depression and disability in 645 adults aged over 65, and identified that regular physical activity buffered comorbid depression among disabled older adults. Further-

---

\* Clients reported these progressions to home care workers, or directly to the research team. Although not formal research data, such feedback was insightful and allowed us to better interpret the results of the study.

more, the moderating effect of physical activity on depression was consistent regardless of whether exercise was vigorous or moderate intensity.<sup>37</sup> The omission of a psychological health measure from our project meant that we could not identify any possible mental health improvements.

Also, a handful of studies have demonstrated that the sexual aspects of health-related quality of life are: (a) of considerable importance to people with chronic illness; (b) under-researched; and (c) rarely discussed in clinical settings.<sup>38,39</sup> In Hill and Reay's anonymous survey of 76 adults with osteoarthritis, 30% of participants with partners reported that osteoarthritis had altered their sexual relationships, and 50% of participants reported that their sexual activity was limited by illness.

### **Limitations of the study and recommendations for future research**

This study was conducted using a single cohort design with a small sample, which compromised the statistical power of the study. The effect sizes identified are small, but probably meaningful and important in the context of clients' lives. Also, selection bias is common in studies recruiting volunteers. In this study, participants were HACC clients who expressed interest in becoming more physically active, thus it is unsurprising that most participants were already somewhat oriented towards exercise. Only two participants entered the study in pre-contemplation stages of behaviour change (see Box 1). All other participants were already thinking about exercise, and were possibly more likely to progress through stages of change than are HACC clients in general. Further investigation with a larger sample and comparison with a control group or a pre-existing data set is recommended.

### **Conclusion**

Because the health status of clients receiving home care is expected to decline over time, these results suggest that even incremental, client-selected increases in physical activity may afford clinically meaningful improvements in some areas

of physical function required for independent living. We encourage HACC workers, within their job description, to assist and support clients in their aspirations to be more physically active. Ongoing professional development for HACC workers in this role is available from VUER. We also encourage allied health professionals and medical practitioners to negotiate safe, structured exercise programs for HACC clients, understanding that HACC workers are available to support these interventions.

### **Acknowledgement**

Victoria University received grant funding from the State Government of Victoria to conduct this research in conjunction with the Shire of Melton, City of Brimbank and City of Maribyrnong.

### **Competing interests**

The authors declare that they have no competing interests.

### **References**

- 1 State Government of Victoria. Victorian Home and Community Care (HACC) Program Manual. Melbourne: Department of Human Services, 2003.
- 2 Polder JJ, Barendregt JJ, van Oers H. Health care costs in the last year of life — the Dutch experience. *Soc Sci Med* 2006; 63: 1720-31.
- 3 Cyarto EV, Moorhead GE, Brown WJ. Updating the evidence relating to physical activity intervention studies in older people. *J Sci Med Sport* 2004; 7 (Suppl 1): 30-8.
- 4 Keysor JJ. Does late-life physical activity or exercise prevent or minimize disablement? A critical review of the scientific evidence. *Am J Prev Med* 2003; 25 (Suppl 2): 129-36.
- 5 Maurer BT, Stern AG, Kinossian B, et al. Osteoarthritis of the knee: isokinetic quadriceps exercise versus an educational intervention. *Arch Phys Med Rehabil* 1999; 80: 1293-9.
- 6 de Jong Z, Munneke M, Zwinderman AH, et al. Is a long-term high-intensity exercise program effective and safe in patients with rheumatoid arthritis? *Arthritis Rheum* 2003; 48: 2415-24.
- 7 Paluska SA, Schwenk TL. Physical activity and mental health: current concepts. *Sports Med* 2000; 29: 167-80.

- 8 Rejeski WJ, Ettinger WHJ, Martin K, Morgan T. Treating disability in knee osteoarthritis with exercise therapy: A central role for self-efficacy and pain. *Arthritis Care Res* 1998; 11: 94-101.
- 9 Morgan WP. Physical activity and mental health. Washington, DC: Taylor & Francis, 1997.
- 10 Prochaska JO, DiClemente CC. Towards a comprehensive transtheoretical model of change: stages of change and addictive behaviors. In: Miller WR, Heather N, editors. *Applied clinical psychology*. (2nd ed.) New York: Plenum Press, 1998: p. 3-24.
- 11 Prochaska JO, Velicer WF. Stages of change and decisional balance for 12 problem behaviours. *Health Psychol* 1994; 13: 39-46.
- 12 Marcus BH, Rakowski W, Rossi JS. Assessing motivational readiness and decision-making for exercise. *Health Psychol* 1992; 11: 257-61.
- 13 Reed GR, Velicer WF, Prochaska JO. What makes a good staging algorithm: examples from regular exercise. *Am J Health Promot* 1997; 12: 57-67.
- 14 Reed GR. The transtheoretical model and exercise behavior: a comparison of five staging methods. *Psychology*. Kingston, RI: University of Rhode Island; 1993.
- 15 Goldfried MR, Wolfe BE. Toward a more clinically valid approach to therapy research. *J Consult Clin Psychol* 1998; 66: 143-50.
- 16 Andersen MB, Stoové MA. The sanctity of  $p > .05$  obfuscates good stuff: a comment on Kerr and Goss. *J Appl Sport Psychol* 1998; 10: 168-73.
- 17 Speed HD, Andersen MB. What exercise and sport scientists don't understand. *J Sci Med Sport* 2000; 3: 84-92.
- 18 Beaton DE, Tarasuk V, Katz JN, et al. "Are you better?" A qualitative study of the meaning of recovery. *Arthritis Rheum* 2001; 45: 270-9.
- 19 Cohen J. Things I have learned (so far). *Am Psychologist* 1990; 45: 1304-12.
- 20 Kazis LE, Anderson JJ, Meenan RF. Effect sizes for interpreting changes in health status. *Med Care* 1989; 27 (Suppl 3): S178-S89.
- 21 Prochaska JO, Velicer WF. The Transtheoretical Model of health behaviour change. *Am J Health Promot* 1997; 12: 38-48.
- 22 Fries JF, Spitz PW, Kraines RG, Holman HR. Measurement of patient outcome in arthritis. *Arthritis Rheumatism* 1980; 23: 137-45.
- 23 Fries JF, Ramey DR. "Arthritis specific" global health analogue scales assess "generic" health related quality-of-life in patients with rheumatoid arthritis. *J Rheumatol* 1997; 24: 1697-702.
- 24 Bruce B, Fries JF. The Stanford Health Assessment Questionnaire (HAQ): a review of its history, issues, progress and documentation. *J Rheumatol* 2003; 30: 167-78.
- 25 Bruce B, Fries JF. Stanford Health Assessment Questionnaire: dimensions and practical applications. *Health Qual Life Outcomes* 2003; 1: 20.
- 26 Babbie E. The practice of social research. (8th ed.) Belmont, CA: Wadsworth, 1998.
- 27 Prochaska JO, DiClemente CC. Stages and processes of self-change of smoking: toward an integrative model of change. *J Consult Clin Psychol* 1983; 51: 390-5.
- 28 Marcus BH, Selby VC, Niaura RS, Rossi JS. Self-efficacy and the stages of exercise behavior change. *Res Q Exerc Sport* 1992; 63: 60-6.
- 29 Petitipas AJ, Giges B, Danish SJ. The sport psychologist-athlete relationship: implications for training. *Sport Psychologist* 1999; 13: 344-57.
- 30 Kaplan RM. The Ziggy theorem: toward an outcome-focused health psychology. *Health Psychol* 1994; 13: 451-60.
- 31 Bean JF, Vora A, Frontera WR. Benefits of exercise for community-dwelling older adults. *Arch Phys Med Rehabil* 2004; 85 (Suppl 3): S31-S44.
- 32 Hurley MV, Mitchell HL, Walsh N. In osteoarthritis, the psychological benefits of exercise are as important as physiological improvements. *Exerc Sport Sci Rev* 2003; 31: 138-43.
- 33 Department of Health and Ageing. An active way to better health: National physical activity guidelines for adults [brochure]. Canberra: Australian Government, 2005.
- 34 Nelson ME, Rejeski WJ, Blair SN, et al. Physical activity and public health in older adults: recommendation from the American College of Sports Medicine and the American Heart Association. *Med Sci Sport Exerc* 2007; 39: 1435-45.
- 35 Annesi JJ. Effects of minimal exercise and cognitive behaviour modification on adherence, emotion change, self-image, and physical change in obese women. *Percept Mot Skills* 2006; 91: 322-36.
- 36 Rosie J, Taylor D. Sit-to-stand as home exercise for mobility-limited adults over 80 years of age — GrandStand System™ may keep you standing? *Age Ageing* 2007; 36: 555-62. Epub 2007 Jul 23.
- 37 Lee Y, Park K. Does physical activity moderate the association between depressive symptoms and disability in older adults? *Int J Geriatr Psychiatry* 2008; 23: 249-56.
- 38 Hill J, Reay N. Patients' perceptions of the effects of osteoarthritis on their sexual relationships [abstract]. *Ann Rheum Dis* 2004; 63 (Suppl 1): 543.
- 39 Bosworth A. Beyond the pain — the social and psychological impact of rheumatoid arthritis [abstract]. *Ann Rheum Dis* 2004; 63 (Suppl 1): 560.

(Received 1/10/07, revised 24/01/08, accepted 11/06/08) □