Physical and Psychological Outcomes of a Supported Physical Activity Program for Older Carers

Keith Hill, Robyn Smith, Marcia Fearn, Mary Rydberg, and Rachael Oliphant

This study evaluated health benefits of a supported physical activity program for 116 older carers (mean age 64.4 \([SD = 7.9]\), 85% women). Participants undertook a 6-month center-based physical activity program (strength training, yoga, or Tai Chi). Eighty-eight participants (76%) completed the program. Multivariate repeated-measures ANOVA identified overall significant improvement postintervention \((p = .004)\). Univariate analyses revealed significant improvements for balance, strength, gait endurance, depression, and SF-36 (physical component; \(p < .05\)). There was no change in the Zarit Carer Burden Scale \((p > .05)\). Change in performance scores did not differ significantly between those with higher and lower attendance at classes, although there was significantly greater improvement in gait endurance and balance \((p < .05)\) in those attending classes run twice weekly than in those attending once-weekly classes. In conclusion, a carer physical activity program, providing additional carer support to facilitate participation, can achieve high levels of involvement by carers and significant health benefits.

Key Words: exercise, aging, health, informal care provider

Informal carers or caregivers provide a valuable and increasing societal role in maintaining informal care, support, and quality of life for people who are unwell, disabled, or frail, who without this support might not be able to continue living at home. Greater demands are being placed on informal carers of older people because of a range of changes in the health care and residential-care systems. These changes include shorter hospital stays, discharge to home of patients at lower levels of recovery, and the broader availability of community services to support many frail older people to fulfill their preference to keep living at home rather than move into residential care.

In Australia in 2002, there were an estimated 2.5 million carers, with 490,700 of these classified as primary carers, that is, people who have a main role in
providing care for a person with a severe level of disability (Australian Institute of Health and Welfare, 2004). Around a quarter of primary carers are over 65 years old, and over 80% of this group are caring for another older adult. Most primary carers are women, except for those over 75 years old, where the gender distribution is more even (Australian Institute of Health and Welfare). By 2013, the aging of the Australian population is projected to result in a 20% increase in the number of people with severe or profound core-activity restriction. This group is likely to need either residential care or a primary carer with supported-care arrangements to keep living in the community (Australian Institute of Health and Welfare).

International data reflect a picture similar to that in Australia. In Canada on any given day, an estimated 2 million people provided “some form of care to a family member such as bathing, toileting, dressing, feeding, . . . transfers, supervision with medications, transportation, . . . shopping, errands, supervision, and emotional support” (Alexander, Brighton, Turpin, & Lysne, 2004, p. 1). In the United States, there are approximately 52 million informal or family carers (Health and Human Services, 1998), with between 5.8 and 7 million providing care to people over 65 years old (Health and Human Services; Spector, Fleishman, Pezzin, & Spillman, 2000). The average age of these carers is 63 years (Administration on Aging, 2004), and between 59% and 75% are women (Family Caregiver Alliance, 2005).

As carers undertake this important role, there is increasing evidence that in doing so they often place lower priority on strategies to optimize their own health. In Australia, only 11% of carers report undertaking regular exercise (including swimming) as a means of coping with the stressful aspects of their caring role (Carers Association of Australia, 2000). Nearly half of carers rate their current health status as fair or poor, and 86% think that their overall physical status has been adversely affected by their caring role (Carers Association of Australia). Reduced mental health has been reported among carers relative to the general population (O’Connell, Bailey, & Walker, 2003). Similarly, in the United States, one third of caregivers caring for people over 65 years of age are reported to have fair to poor health (Administration on Aging, 2004). A systematic review of studies evaluating support needs of carers identified strong evidence that carers experience high levels of burden, stress, and worry and that they value opportunities to network in social groups (Stoltz, Uden, & Willman, 2004).

Research evidence from randomized controlled trials indicates that physical activity can improve a range of health outcomes for older people (Gregg, Pereira, & Caspersen, 2000; King, Rejeski, & Buchner, 1998; van der Bij, Laurant, & Wensing, 2002). Various physical activity approaches have been shown to be effective, including Tai Chi (Song, Lee, Lam, & Bae, 2003; Wolf et al., 1996), strength training (Jette et al., 1996; Singh, Clements, & Fiatarone, 1997), group exercise programs (Barnett, Smith, Lord, Williams, & Baum, 2003; Bravo et al., 1996; Day et al., 2002), walking programs (Hamdorf & Penhall, 1999), home exercise programs (Campbell et al., 1997; Jette et al.), and combined supported physical activity programs through general practice (Kerse, Flicker, Jolley, Arroll, & Young, 1999). Other types of physical activity such as yoga have been shown to have health benefits in clinical groups, for example, reduced fatigue in patients with multiple sclerosis (Oken et al., 2004). There have, however, been no randomized trials evaluating the effectiveness of yoga in older people who do not have significant health conditions.
Examples of positive health outcomes from these physical activity studies have included improvement in physical measures such as strength, balance, endurance, coordination, reaction time, and function (Barnett et al., 2003; Bravo et al., 1996; Campbell et al., 1997; Day et al., 2002; Hamdorf & Penhall, 1999; Jette et al., 1996; Singh et al., 1997; Song et al., 2003; Wolf et al., 1996); reduced falls (Barnett et al.; Campbell et al.; Day et al.; Wolf et al.); improved physiological measures such as reduced blood pressure (Wolf et al.); improved psychological state such as reduced depression and anxiety (Bravo et al.; Singh et al.); improved quality of life (Kerse et al., 1999; Singh et al.); and maintenance of bone strength (Bravo et al.; Nelson, Fiatarone, Morganti, Trice, & Evans, 1994).

Despite the potential for improved health outcomes, physical activity has rarely been investigated as a health-promoting option for older carers. One randomized controlled trial using a home-based walking program identified significant improvements in carers’ total energy expenditure, stress-induced blood-pressure reactivity, and sleep quality (King, Baumann, O’Sullivan, Wilcox, & Castro, 2002). Alexander and colleagues (2004) used a pre–post design at five study sites across Canada to evaluate the effectiveness of a variety of home- and center-based exercise approaches for carers. This pilot study primarily reported self-perceived benefits and challenges associated with carers participating in this type of program. There is a clear need for this work to be extended using a broader range of physical, psychological, and general health-outcome measures.

A range of potential barriers for older adults’ becoming engaged in physical activity programs has been reported, including cost, access, presence of chronic health conditions, previous negative experiences with exercise, and lack of knowledge about the benefits of exercise (Gavin & Myers, 2003; Rhodes et al., 1999; Williams & Lord, 1995). These issues and others, such as concerns about leaving the care recipient, are likely to be even more relevant for older carers and warrant evaluation in this group. In fact, being a carer has been reported as a barrier to undertaking regular physical activity, especially center-based physical activity programs (Brawley, Rejeski, & King, 2003).

The aim of the present study was to evaluate the effectiveness of a supported physical activity program in achieving improved physical, psychological, and general health outcomes for older carers. Secondary aims included identifying barriers and enablers to sustained participation in the program.

**Methods**

**Participants**

One hundred sixteen carers were recruited through a range of health care services, existing carer support groups and carer respite programs, and through general promotion in the eastern metropolitan region of Melbourne, Australia. Carers had an average age of 64.4 years ($SD = 7.9$), and 98 were women (85%). Carers reported having been involved in the caring role for a median of 5 years. Seventy-three percent were providing care for their spouses, 16% for their mothers or fathers, 9% for their sons or daughters, and 2% other. Responses to the baseline questionnaire about the caregiving role indicated that at least half the participating carers were experiencing a number of stressors including feeling unable to get on top of all
the things to be done (70%), having to be on call to help the care recipient (68%), and being unable to rest when they were ill themselves (68%). Care recipients were mostly men (69%), with an average age of 69.4 years ($SD = 15.9$). Fifty-four percent of care recipients completely depended on the carer to get to places outside of walking distance, and 39% of care recipients depended on the carer to be able to take a bath, shower, or sponge bath. Forty-six percent of carers indicated that their care recipient could rarely be left alone unsupervised for a couple of hours during the day.

**Procedures**

The project was approved through the Royal Melbourne Hospital Research Foundation’s Clinical Research Ethics Committee. All carers were provided with an information kit outlining their involvement and the project aims. Before participating in the project, carers were asked to discuss participation in the physical activity program with their general practitioners and obtain verbal consent from them to participate. All participants gave written, informed consent before participating in the project, which included a statement that they had received verbal approval from their general practitioners. Participants were assessed by trained staff at each of the participating centers on a comprehensive series of physical, psychological, and self-rated health measures before commencement of the program. Before the baseline assessment sessions, the assessors were provided with a training manual outlining all assessment procedures and participated in an assessment-training session with a physical therapist with aged-care experience.

All assessment measures, except for the baseline questionnaire, were performed at baseline and repeated at the conclusion of the 6-month physical activity program. Questionnaires were provided to participants before the assessment sessions to reduce assessment time. Participants brought the completed questionnaires to the assessment sessions. The assessment sessions took between 45 and 60 min. All the assessment measures used have moderate to high reliability and validity reported in samples of older people.

Questionnaires and assessment items included the following:

- A **baseline questionnaire**, based on a caregiver-screening instrument developed by Braithwaite, Pollitt, and Roach (2000), that examined aspects of the caregiving role from the carer’s perspective, such as the relationship with the care recipient, the amount of assistance provided, duration of the caring role, and feelings related to the caring role.

- The **Assessment of Quality of Life** (AQoL; Hawthorne, Richardson, & Osborne, 1999), a 15-item questionnaire that evaluates quality of life (internal consistency, Cronbach’s $\alpha = .81$).

- The **Zarit Carer Burden Interview** (Zarit, Reever, & Bach-Peterson, 1980), a questionnaire that evaluates carer burden and asks about many commonly reported difficulties faced by carers (intraclass correlation coefficient $= .71$, Cronbach’s $\alpha = .91$).

- The 15-item abbreviated version of the **Geriatric Depression Scale** (GDS; Yesavage et al., 1983), which measures depression (internal consistency, Cronbach’s $\alpha = .80$). A score of 4 or more has been reported to indicate clinical signs of depression (D’Ath, Katona, Mullan, Evans, & Katona, 1994).
• A 94-item questionnaire, the Human Activity Profile (HAP; Fix & Daughton, 1988), which measures activity level. The activities are listed in order of increasing energy expenditure and are rated as still doing, have stopped doing, or never did the activity. The highest rated item listed as still doing was recorded as the maximal activity score, and it minus the number of lower numbered items reported as have stopped doing was recorded as the adjusted activity score. The adjusted activity score was reported for the purposes of this study. High retest reliability has been reported for the HAP-adjusted activity score in older adults, including those with osteoarthritis (intraclass correlation coefficients .87–.95; Bennell et al., 2004; Bilek, Venema, Camp, Lyden, & Meza, 2005).

• A step test was used to assess dynamic standing balance (intraclass correlation coefficient >.90). The step test involves stepping one foot fully on then off a 7.5-cm step as quickly as possible in 15 s (Hill, Bernhardt, McGann, Maltese, & Berkovits, 1996). Each leg was tested separately, and the lowest score recorded.

• Gait velocity and endurance: Walking speed (velocity, m/min) was measured by timing participants walking at comfortable speed along the central 6 m of a 10-m walkway (intraclass correlation coefficients .82–.98 for sample of stroke patients; Hill, Goldie, Baker, & Greenwood, 1994). Gait endurance was assessed using the 6-min walk test, which evaluates the maximum distance an individual can walk in 6 min (Guyatt et al., 1985). High retest reliability has been reported in samples of community-dwelling older people (intraclass correlation coefficients .88–.95; Harada, Chiu, & Stewart, 1999; Simonsick, Gardner, & Poehlman, 2000). Participants could stop if they felt the need during the test and resume when they felt able, although timing continued throughout any rest breaks.

• The timed sit-to-stand test was used to evaluate general leg-muscle strength. The participants were timed on how quickly they could stand up then sit down again three times from a standard-height (45-cm) chair with arms (Tinetti, Doucette, Claus, & Marottoli, 1995). Participants were allowed to use their arms for the test if they needed to.

• The Medical Outcomes Survey Short Form 36 (SF-36; Ware, 1993) measured self-rated health (Cronbach’s α >.85; Brazier et al., 1992). This self-completed survey measures eight domains: physical functioning, role physical, bodily pain, general health, vitality, social functioning, role emotional, and mental health. Summary measures of the physical- and mental-component scores were derived.

Postprogram Evaluation Questionnaire. At the end of the 6-month exercise program, participants anonymously completed an evaluation questionnaire. This questionnaire, also based on the survey by Braithwaite et al. (2000), evaluated carers’ perceptions about benefits associated with the program and any difficulties or suggestions for improving it. Twenty statements were rated on a scale of 0 (don’t agree at all) to 10 (agree wholeheartedly). Positive and negative statements were mixed throughout the questionnaire.

Exit Questionnaire. If participants withdrew from the exercise program before the end of the 6-month intervention, they were asked to complete an exit questionnaire. The exit questionnaire asked about how they found the physical activity
program, how long they participated in it, their main reason for withdrawing from it, its benefits, and what improvements they thought could be made to it.

**Intervention: The Healthy Carers Physical Activity Program.** Staff at each of the eight participating centers discussed four physical activity options with the carers registering interest in the program. The four options were Tai Chi for arthritis (Song et al., 2003), strength training, yoga (Hatha style), and circuit training with an emphasis on strength, fitness, and aerobic activities and balance (similar to the PACE [Programmed Accommodating Circuit Exercise] program that was used in older men and women to improve health-related components of fitness; Takeshima et al., 2004). Allowing choice of the type of physical activity undertaken by a group was considered an important strategy to maximize uptake and sustained participation in the physical activity program. In total, there were two yoga groups (n = 16 participants), eight strength-training groups (n = 95 participants), and one Tai Chi group (n = 5 participants), with some centers offering more than one option. Seven of the groups ran two 1-hr sessions per week (six strength-training groups and one yoga group); the other groups ran once weekly for 1 hr. Refreshments and an opportunity for networking and support were provided after each session. Carers had the option of additional respite care to enable participation in the physical activity program, if required, through Villa Maria Carer Support Services.

**Statistical Analysis**

Data were analyzed using the Statistical Package for Social Sciences (SPSS) for Windows, version 10.1. Frequency counts, percentages, and, where appropriate, median and range were reported for questionnaire items. All interval or ratio baseline measures were assessed for normality of distribution; the appropriate parametric tests were conducted if distributions were normal, and nonparametric tests used if not. Repeated-measures multivariate analysis of variance (MANOVA) was performed on the main outcome measures, with subsequent univariate analysis of variance (ANOVA) to evaluate change on individual measures over the 6-month intervention period. Participants were categorized as high attenders (≥65% of classes) or low attenders (<65% of classes). Change scores for each outcome measure were compared between high and low attenders and those attending classes run twice weekly compared with those attending classes run once weekly, using independent t tests (p < .05).

**Results**

Eighty-eight of the 116 participants (76%) completed the 6-month program and undertook the follow-up assessment. Main reasons for withdrawal included health problems of the care recipient or the carer (unrelated to the program); time constraints—for example, clashes with appointments; difficulty with access; and trying to fit the extra activities in with caring responsibilities. There were no significant differences in baseline measures between those who did and those who did not complete the program (p > .05). The participants who completed the program attended a median of 75% of available sessions (minimum 18%, maximum 100%). Attendance rates did not vary significantly by type of exercise (p = .53).
Baseline and 6-month follow-up measures for the participants who completed the program are reported in Table 1. Baseline measures indicate that participants were generally physically well, although scores were overall approximately 15% worse on average than normative scores for healthy people of similar age (Gibbons, Fruchter, Sloan, & Levy, 2001; Hill, Schwarz, Flicker, & Carroll, 1999; Steffen, Hacker, & Mollinger, 2002; Tinetti et al., 1995). Repeated-measures MANOVA identified a significant overall difference across the outcome measures from baseline to the 6-month assessment after completion of the physical activity program ($F = 3.406, p = .004$). Univariate ANOVA revealed significant improvements for the step test, leg strength, gait endurance, and self-rated health (physical-component score) and significant reduction in depression ($p < .05$). On average, there was a 7% improvement across the measures, with the greatest improvement being a 26% reduction for the depression measure (Table 1). Several measures remained relatively unchanged after the intervention, including gait velocity and scores on the Zarit Carer Burden Scale.

Participants were classified as high attenders if they attended 65% or more of available sessions (64% of participants) or low attenders if they attended fewer than 65% of available sessions. There were no significant differences between the high-attender group and the low-attender group on baseline measures ($p > .05$), and there was no significant difference in the percentage change on each of the outcome measures between the high- and low-attender groups ($p > .05$). There was

<table>
<thead>
<tr>
<th>Table 1  Baseline and 6-Month Follow-Up Measures for the 88 Participants Completing the Exercise Program, $M (SD)$</th>
<th>Normative comparison scores</th>
<th>Baseline</th>
<th>Follow-up</th>
<th>% Change$^b$</th>
<th>t-Test $p$ value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balance: step test, steps/15 s; score for worst leg</td>
<td>16.5$^c$</td>
<td>13.0 (3.5)</td>
<td>14.6 (4.4)</td>
<td>12.3%</td>
<td>.000</td>
</tr>
<tr>
<td>Gait: velocity (m/min)</td>
<td>80$^d$</td>
<td>84.7 (16.7)</td>
<td>86.4 (18.8)</td>
<td>2.0%</td>
<td>.419</td>
</tr>
<tr>
<td>Gait endurance, 6-min walk (m)</td>
<td>583$^e$</td>
<td>474.7 (90.5)</td>
<td>499.2 (111.5)</td>
<td>5.2%</td>
<td>.008</td>
</tr>
<tr>
<td>Leg strength: timed sit-to-stand 3 times (s)$^f$</td>
<td>8.7$^f$</td>
<td>12.0 (2.7)</td>
<td>10.5 (2.7)</td>
<td>12.5%</td>
<td>.000</td>
</tr>
<tr>
<td>Activity level: HAP-adjusted activity score</td>
<td>71.3$^c$</td>
<td>63.7 (10.5)</td>
<td>66.5 (11.0)</td>
<td>4.4%</td>
<td>.005</td>
</tr>
<tr>
<td>Psychometric measures: depression (GDS 15)$^a$</td>
<td>3.8 (3.4)</td>
<td>2.8 (3.0)</td>
<td>26.3%</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>carer burden (Zarit)$^a$</td>
<td>39.3 (18.0)</td>
<td>39.5 (16.2)</td>
<td>0.5%</td>
<td>.936</td>
<td></td>
</tr>
<tr>
<td>Assessment of Quality of Life$^a$</td>
<td>9.4 (5.3)</td>
<td>8.8 (4.3)</td>
<td>6.4%</td>
<td>.128</td>
<td></td>
</tr>
<tr>
<td>Self-rated health (SF-36): physical-component score</td>
<td>43.6 (10.2)</td>
<td>46.1 (8.3)</td>
<td>5.7%</td>
<td>.038</td>
<td></td>
</tr>
<tr>
<td>mental-component score</td>
<td>46.7 (11.2)</td>
<td>49.2 (10.1)</td>
<td>4.7%</td>
<td>.084</td>
<td></td>
</tr>
</tbody>
</table>

$^a$Decreased score on these measures indicates improved performance. $^b$Percentage change calculated as (postintervention score – preintervention score) $\times$ 100/preintervention score. $^c$Sample of healthy women, 70–74 years old (Hill et al., 1999). $^d$Women, 70–79 years old, comfortable walking speed (Steffen et al., 2002). $^e$Women, 61–80 years old (Gibbons et al., 2001). $^f$Tinetti et al., 1995.
significantly greater improvement in gait endurance (6-min walk test) and balance performance (step test) over the 6-month physical activity period in those attending classes that ran twice weekly, compared with those who attended classes that ran once weekly \((p < .05)\).

Responses to the postprogram evaluation questionnaire indicated that, overall, participants had positive impressions of the program (Table 2). “I enjoyed the social atmosphere of the program” was the item with the smallest range of responses (7–10) and the highest median score (10/10), highlighting the importance of the social support provided by this type of program. Although over 70% responded highly positively to 12 of the 20 statements, almost all statements had responses extending across the full available range (0–10). This indicated that although most carers responded positively, there was at least a small percentage reporting the other extreme response, suggesting difficulties or dissatisfaction with some elements of the program. For example, 5% of carers indicated that the program interfered with their caregiving role (rated as 7–8), 6% reported that participation made the care recipient feel resentful (rated as 7–9), and 21% reported they were worried about being away from the care recipient (rated as 7–10). Similar responses were given in the exit questionnaires by some of the participants who ceased participation partway through the program.

**Discussion**

The results of this study highlight the fact that many of the benefits of physical activity previously reported for older people generally (King et al., 1998) can also be achieved by older people who are carers, using a program that supports their capacity to be involved in center-based physical activity programs. Health benefits included improved balance, leg strength, gait endurance, and self-rated physical health and reduced depression. Most respondents reported other positive benefits, including that the program was enjoyable, that it gave them time to look after their own needs, and that it gave them a complete break from the caregiving role. Nicholl, Coleman, and Brazier (1994) have estimated that, in Britain, participation in physical activity by older people leads to an annual health care cost benefit of over £20 per person. Benefits might be even greater for at-risk groups such as older carers.

Although there were improvements in both physical and psychological outcomes (for example, depression), there was no significant change in the level of carer burden as assessed by the Zarit Carer Burden Interview and no significant change in the carers’ quality of life over the 6-month program. One study has reported that carer burden was significantly associated with carers’ quality of life in a sample of carers of people with Alzheimer’s disease (Bell, Araki, & Neumann, 2001). Carer burden encompasses a broad range of factors, many of which were not directly addressed by the physical activity program. Although most participants demonstrated and expressed improvements associated with the program, the specific stresses associated with their caring role when they returned home remained largely unchanged. Whether improvements in physical and psychological well-being were related to a greater ability to cope with the same level of carer stress was not explored but would be important to investigate in future studies, both in the short and in the longer term. Furthermore, it is possible that the stresses associated with
Table 2  Questionnaire Responses at the End of the Physical Activity Program

<table>
<thead>
<tr>
<th></th>
<th>Average (median) score</th>
<th>Range of responses</th>
<th>&gt;70% giving highly positive response&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attending the program introduced me to skills that I didn’t have before.</td>
<td>8</td>
<td>0–10</td>
<td></td>
</tr>
<tr>
<td>Attending the program reminded me of things I had been missing in my life.</td>
<td>8</td>
<td>0–10</td>
<td></td>
</tr>
<tr>
<td>Attending the program gave me an opportunity to get absorbed in something other than caregiving.</td>
<td>10</td>
<td>0–10</td>
<td>✓</td>
</tr>
<tr>
<td>Attending the program recharged my batteries.</td>
<td>10</td>
<td>0–10</td>
<td>✓</td>
</tr>
<tr>
<td>The program made me feel inadequate as a person.</td>
<td>0</td>
<td>0–5</td>
<td></td>
</tr>
<tr>
<td>The program added to my frustration with life.</td>
<td>0</td>
<td>0–5</td>
<td>✓</td>
</tr>
<tr>
<td>The program interfered with my caregiving responsibilities.</td>
<td>0</td>
<td>0–8</td>
<td>✓</td>
</tr>
<tr>
<td>My attendance at the program made the person I am caring for feel resentful.</td>
<td>0</td>
<td>0–9</td>
<td>✓</td>
</tr>
<tr>
<td>My attendance at the program upset the person I was caring for.</td>
<td>0</td>
<td>0–8</td>
<td>✓</td>
</tr>
<tr>
<td>I enjoyed the social atmosphere of the program.</td>
<td>10</td>
<td>7–10</td>
<td>✓</td>
</tr>
<tr>
<td>I have found a new interest through this program.</td>
<td>9</td>
<td>0–10</td>
<td></td>
</tr>
<tr>
<td>I will try to continue the program in my spare time.</td>
<td>9</td>
<td>0–10</td>
<td></td>
</tr>
<tr>
<td>I plan to enroll myself in another program.</td>
<td>9</td>
<td>0–10</td>
<td></td>
</tr>
<tr>
<td>I was scared about starting this program.</td>
<td>0</td>
<td>0–10</td>
<td></td>
</tr>
<tr>
<td>I was worried about being away from the person I was caring for when I started this program.</td>
<td>0</td>
<td>0–10</td>
<td></td>
</tr>
<tr>
<td>I would do this program again.</td>
<td>10</td>
<td>0–10</td>
<td>✓</td>
</tr>
<tr>
<td>Attending this program gave me time to look after my own needs.</td>
<td>10</td>
<td>0–10</td>
<td>✓</td>
</tr>
<tr>
<td>Attending this program gave me a complete break from caregiving.</td>
<td>10</td>
<td>0–10</td>
<td>✓</td>
</tr>
<tr>
<td>I wouldn’t have done such a program if the staff of the research project hadn’t organized it for me.</td>
<td>10</td>
<td>0–10</td>
<td>✓</td>
</tr>
<tr>
<td>There were times I felt guilty about leaving my caregiving responsibilities to go to the program.</td>
<td>0</td>
<td>0–10</td>
<td>✓</td>
</tr>
</tbody>
</table>

<sup>Note</sup>. Scale of 0–10, with 0 indicating don’t agree at all, 5 indicating neither agree nor disagree, and 10 indicating agree wholeheartedly.

<sup>a</sup>Highly positive response rated as 9–10 on scores where 10 was a positive response and 0–1 where 10 was a negative response.
leaving a care recipient while going to a physical activity program might actually increase carer burden. Therefore, having no significant increase in carer burden from preintervention to postintervention could be seen as a positive outcome for the participants. There is a clear need for further research aiming to clarify the specific relationships between carer burden, quality of life, and psychological and physical status to ensure that support programs of all types, including physical activity programs, have the greatest impact possible across these important domains.

Physical activity should be considered one of a range of support services available to help carers maintain physical and mental well-being and to continue in their caring role. Other approaches that have been shown to have positive health outcomes for carers include a training program (Kalra et al., 2004), cognitive-behavioral family intervention (Marriott, Donaldson, Tarrier, & Burns, 2000), cognitive-behavioral therapy (Secker & Brown, 2005), inclusion in a health-promotion program (either physical activity or nutrition education) with consistent contact with health professionals (Castro, Wilcox, O’Sullivan, Baumann, & King, 2002), and attendance of the care recipients (with mild to moderate cognitive impairment) and their carers at a memory clinic (Logiudice et al., 1999).

The retention rate for this sample of older carers was 76%, which was similar to (McMurdo & Johnstone, 1995, 80%) or lower than (Pollock et al., 1991, 86%; Wallace et al., 1998, 90%) a number of other 6-month-duration physical activity programs targeting older adults generally. A range of facilitators to participation were identified, with most participants reporting that the program “recharged their batteries,” that they enjoyed the social element of the program, and that their attending the program did not upset their care recipients. In contrast, a smaller proportion of participants noted a number of barriers that impeded their ability to participate, including difficulty in accessing the program, health problems of the care recipients, health problems of the carers, and issues with the caring role, such as the care recipient’s not wanting them to go to the program or not having appropriate respite available. Some of these issues are more specific to older carers (for example, requiring respite to enable them to attend the program), and others are relevant to any physical activity program for older adults (Rhodes et al., 1999).

Considerable resources were required to implement the program, although no attempt was made to quantify these. O’Connell and colleagues (2003) have reported that many carers feel unable to leave their care recipients in order to participate in health-related activities. In our study, additional resources were required to support carers’ participation, including providing funding for the physical activity instructor, provision of additional respite care (including travel time and travel expenses, if required) to enable participation in the program, and overall coordination of the program. The physical activity instructors at each center and the project worker also played a key role in providing support to carers and encouraging them to explore options that would enable them to participate in the program. After completing the program, many participants expressed a keenness for the groups to continue, although in a number of cases this could not be sustained beyond the funded period of the study because the funding was no longer available. Provision of transport to and from the program (if center-based) and the provision of respite were factors identified by participants as things that would help them attend a physical activity program.
From the results of this study and feedback from participants, program developers need to consider a number of issues to maximize uptake and sustainability of physical activity options for older carers:

- Carers are likely to have different preferences as to the types of physical activity they would like to undertake, so there should ideally be a number of options available.
- Some carers might prefer a home-based approach to physical activity (e.g., Campbell et al., 1997; Jette et al., 1996), whereas others might prefer the social and supervised elements of center-based group physical activity.
- Some carers might prefer an option to bring the care recipients to the center for respite while they are undertaking the center-based physical activity program (so that they are nearby if needed).
- Some carers will have additional respite needs to enable participation, and options to support this should be available. In our study, a level of staff support was crucial in identifying and addressing issues that might have impeded a carer from participating in the program.
- Additional flexibility in the frequency and timing of physical activity classes being conducted could increase the ability of carers to attend.
- Strategies to minimize barriers need to be implemented, including keeping costs to participants as low as possible.

Several limitations were identified during the current study. The pre–post methodology and the lack of a control group for comparison are limitations. Furthermore, the variability in the physical activity options and frequency of the program between centers did not allow for comparison between groups. The advantage of offering only one physical activity option in all participating centers would be to have a higher powered, single intervention study. As previously stated, however, allowing participants a choice in the type of physical activity in which they participated was seen as an important factor for maximizing uptake of the activity. Finally, some of the pre- and postintervention assessments were undertaken by the same person who provided the physical activity intervention. Despite the limitations, these promising results provide support for a randomized controlled trial with blinded assessors to formally evaluate outcomes, which should also incorporate an economic analysis of costs associated with outcomes achieved. Further studies are required to compare the benefits of a center-based physical activity program, such as the social aspects, with the benefits of a home-based physical activity program and to determine whether this reduces carer burden.

Summary

A 6-month supported physical activity program for older carers (strength training, Tai Chi, or yoga) resulted in significant improvements in physical and psychological health outcomes. Most carers reported enjoying the program and reported a range of self-perceived benefits associated with it.
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