

# Physical Activity Levels of Older Adults Receiving a Home Care Service

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The 3 study objectives were to compare the activity levels of older people who had received a restorative home care service with those of people who had received “usual” home care, explore the predictors of physical activity in these 2 groups, and determine whether either group met the minimum recommended activity levels for their age group. A questionnaire was posted to 1,490 clients who had been referred for a home care service between 2006 and 2009. Older people who had received a restorative care service were more active than those who had received usual care ( $p = .049$ ), but service group did not predict activity levels when other variables were adjusted for in a multiple regression. Younger individuals who were in better physical condition, with good mobility and no diagnosis of depression, were more likely to be active. Investigation of alternatives to the current exercise component of the restorative program is needed.

**Keywords:** restorative home care services, aging, exercise

It is well accepted that being physically active at any age is good for a person’s health and well-being, and many Western countries and health-related organizations such as the World Health Organization (WHO) have recommended levels of physical activity for all age groups to encourage people to exercise sufficiently (WHO, 2010). The Australian government recommends that older people accumulate a minimum of 30 min of moderate-intensity physical activity every day and choose a range of activities including strength, fitness, balance, and flexibility to achieve this (Australian Government Department of Health and Ageing, 2009a; Sims, Hill, Hunt, & Haralambous, 2010). Older Americans are encouraged to complete a minimum of 150 min of moderate-intensity aerobic exercise each week plus two sessions of strength and balance exercises (U.S. Department of Health and Human Services, 2008). The WHO has a number of recommendations for people age 65 years and above, providing options for those who choose moderate-intensity exercise (150 min/week) and those preferring vigorous-intensity exercise (75 min/week; WHO, 2011).

Being physically active increases strength, balance, and stamina and decreases the risk of, or helps control, many chronic diseases (Cress et al., 2006; Taylor et al., 2004). As people age there is a tendency to be less physically active, and this

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decrease in activity has been shown to have a negative effect on a person's strength, balance, and stamina (Pope, Lane, Tolma, & Cornman, 2008; Warburton, Nicol, & Bredin, 2006). The loss of strength and balance can lead to an increase in falls for older people, which often results in injury or, at the least, a loss of confidence (Campbell, Robertson, Gardner, Norton, & Buchner, 1999; Warburton et al., 2006). To reduce the likelihood of falling and to maintain functional independence for older people, the WHO and a number of countries recommend strength training at least 2 days/week, in conjunction with other activities such as walking (WHO, 2010).

Given the health benefits of being physically active, it is important to understand the variables influencing activity. A number of factors have been identified as influencing activity participation among older people, including age and demographic factors (e.g., level of education, ethnicity, living status), history of exercise activity, attitude toward being active, health status, functional-mobility status, and psychological, social, and environmental factors (Boyette et al., 2002; King & Guralnik, 2011; Rhodes et al., 1999; Stead, Wimbush, Eadie, & Teer, 1997).

As people reach their latter years, some become frail or experience injury or illness and need assistance to manage their health and undertake everyday living activities. As older people who are experiencing these difficulties wish, in the main, to remain living in their own homes, the Australian government funds a range of home care services to support this aim. Many of these are funded through the Home and Community Care (HACC) program, a joint federally and state-funded program. Until the last few years, these services, which can include nursing or allied health care, personal care, domestic assistance, meals, and transport (Department of Health and Ageing, 2010), have generally focused on providing assistance with the activities with which older adults are having difficulty. More recently, there has been a move toward a focus on a more capacity-building approach that emphasizes maximizing what older people can do for themselves rather than simply doing things for them.

The adoption of this change in focus has been gradual in Australia over the last decade but has been more apparent in the United Kingdom, where there has been government support for a reablement approach in which a restorative service is provided to people referred for home care services before ongoing care is considered. The aim of a restorative care service has been defined as to "create independence, improve self-image and self-esteem, and reduce the level of care required" through the delivery of an individualized program (Atchison, 1992, p. 8). Restorative care services are generally short term (6–12 weeks in length) and multidimensional, including components such as goal setting, a strength and balance exercise program, task analysis and design, use of aids and equipment, and medication management. They are usually delivered by allied health professionals or, as in the UK, by specifically trained home care staff.

In Australia, Silver Chain, a large West Australian community care organization, developed the first restorative home care service, the Home Independence Program (HIP), over 10 years ago and subsequently subjected it to increasingly rigorous testing. A nonrandomized controlled trial found that older people who participated in HIP had better individual and service outcomes than older people who received "usual" HACC services (Lewin & Vandermeulen, 2010). These findings were then confirmed in a larger randomized controlled trial (De San Miguel & Lewin, 2008). A recent systematic review of the evidence on the effectiveness of restorative home

care services concluded that although the body of evidence is currently small, it clearly suggests that a restorative approach has significant advantages over the traditional approach (Ryburn, Wells, & Foreman, 2009).

Although restorative home care services differ somewhat in their constituent parts, depending on the country, provider, and difficulties being experienced by the older person, the majority have a physical activity component that includes balance and/or strength exercises (Lewin & Vandermeulen, 2010; Tinetti et al., 2002). It is not known, however, whether individuals who participated in an exercise program as part of their restorative service continue being physically active after the service has finished, whether they are more physically active than people who received “usual” home care services, or whether they are as active as they “should be” according to the recommended levels for older people.

The first objective of this study was to compare the physical activity levels of older people (70 years and over) who had received a restorative home care service (HIP) with those of older adults who had received usual home care services (HACC). The second was to explore factors that predict being physically active among older home care clients, and the third was to determine whether either home care service group met the minimum recommended levels of activity promoted by the Australian government (Australian Government Department of Health and Ageing, 2009a).

## Methods

### Study Design

This was a cross-sectional descriptive study in which clients were surveyed by mail 1–4 years after having been referred for home care services.

### Survey Population and Sample

The study population included the 9,199 individuals who had been referred to Silver Chain for home care between 2006 and 2009 and who had received HIP (4,844) or usual HACC (4,355) services.

Fifteen percent ( $n = 745$ ) of HIP and 17% ( $n = 745$ ) of HACC clients who met the inclusion criteria were randomly selected from this population to be surveyed. The inclusion criteria for participants were being 70 or more years of age, having received a minimum of 4 weeks or 4 visits of HIP or HACC between 2006 and 2009, and living in the community (i.e., not in residential care or hospital at the time of the study). The exclusion criteria were not being able to communicate adequately in English or having been diagnosed with dementia.

A study by Saarloos et al. (2008) exploring the physical activity levels of Western Australian adults was used to help determine the sample size. They found that 53% of the 65-year and older population undertook sufficient amounts of physical activity to gain health benefits. It was thought that as the population in this study was age 70+ years and had been referred for home care it could be expected to be about half to two thirds as active as the general population and, to be able to detect this sort of difference in the proportion of the two groups (i.e., 26% vs. 36%) that were exercising sufficiently with 80% power and an alpha level of .05, that a sample of 335 was needed in each group (Dupont & Plummer,

1990). Anticipating approximately a 50% return rate, we therefore surveyed 750 HIP and 750 HACC clients.

## Survey Tool

A questionnaire was developed that incorporated a number of tools including the Physical Activity Scale for the Elderly (PASE), the SF-12v2© Health Survey, and the Geriatric Depression Scale-5 (GDS-5). All three tools have demonstrated validity and reliability when used with older people. The PASE is a 12-item instrument specifically designed to assess physical activity levels in large samples of older people over a 1-week period (Washburn, McAuley, Katula, Mihalko, & Boileau, 1999). It combines physical activity information from several areas including leisure, household, and occupational activity (McAuley, Jerome, Elavsky, Marquez, & Ramsey, 2003). Respondents were asked to indicate the number of days of activity per week and hours per day for sitting activities; walking; light, moderate, or strenuous sport activities; and specific strength activity they had completed during the past 7 days (Washburn, Smith, Jette, & Janney, 1993). To complete the household-activities section respondents answered yes or no to having completed household tasks over the last week, and the section on occupational activities asked for number of hours completed per week (Washburn et al., 1993). From these answers, a score was calculated based on activity frequency and an activity-weighted score multiplied by frequency (Washburn et al., 1993). The higher the PASE score, the more physically active the person is, with PASE scores ranging from zero to 400. Population norms (*M*) for the PASE are, for men 70–75 years, 102.4 (*SD* = 53.7); 76–100 years, 101.8 (*SD* = 45.7); for women 70–75 years, 89.1 (*SD* = 55.5); and 76–100 years, 62.3 (*SD* = 50.7; Washburn et al., 1993).

The SF-12v2© Health Survey is the short form of the SF-36, the commonly used measure of physical and mental health (McBride, Adamson, Bunting, & McCann, 2009; Ware, Kosinski, Turner-Bowker, & Gandek, 2002). The survey consists of 12 items across eight health domains. Two component scores are calculated: the physical-component summary and the mental-component summary, which can be compared with United States population norms (Cheak-Zamora, Wyrwich, & McBride, 2009).

The GDS-5 is a short form of the widely used Geriatric Depression Scale and is commonly used as a screening tool for depression in older people (Hoyl et al., 1999; Rinaldi et al., 2003; Weeks, McGann, Michaels, & Penninx, 2003).

In addition to including these three measures, the questionnaire also collected demographic and health data including education level, body-mass index, and mobility status.

## Data Collection

Questionnaires were mailed to the study sample together with a letter explaining the study and a replied paid envelope. Consent was assumed by the completion and return of the questionnaire.

## Ethics

Ethics approval for the study had been granted by the Silver Chain and Curtin University Human Research ethics committees.

## Statistical Analysis

All analyses were performed using SPSS (version 18.0). Data were initially examined for normality of distribution. We then performed *t* tests, chi-square tests, or ANOVAs, depending on the type and distribution of the variable being examined, to determine any differences between home care service groups (HIP vs. HACC).

After completing the one-way analyses of variance and calculating Pearson product-moment correlation coefficients to examine the relationships between the characteristics of individuals and their PASE scores, characteristics that had a significant relationship were entered into a multiple regression to determine which factors best predicted an older person receiving home care services being more physically active. None of the independent variables were found to exhibit multicollinearity (bivariate correlation coefficients were estimated and all found to be less than .05). A *p* value of .05 or less was considered statistically significant.

Because a total PASE score combines physical activity associated with household and occupational activity with that undertaken as exercise, it cannot be used to determine whether an individual is meeting the levels of physical activity recommended by different countries or by the WHO. However, Questions 2–6, which are specifically about exercise, were used to determine whether individuals were exercising at a level that could be considered to match the recommended physical activity levels for older people living in Australia (i.e., at least 30 min of moderate intensity activity each day, where moderate intensity is defined as an increase in heart rate and some shortness of breath but still being able to comfortably talk while doing the activity; Glasgow et al., 2005). Individuals who met or exceeded the minimum amount of activity to reach the recommended government levels were deemed sufficiently active.

## Results

Ten questionnaires were returned unopened. Five hundred six of the remaining 1,490 were returned, a response rate of 34.0%. Table 1 shows the basic demographics of the sample according to type of home care service received, HIP or HACC, and for the group as a whole (total). The difference in the proportions of women and men involved in the study was statistically significant ( $\chi^2 = 6.79$ ,  $df = 1$ ,  $p = .009$ ), as was the proportion of HACC clients receiving a service in their country town compared with those receiving HIP ( $\chi^2 = 24.89$ ,  $df = 2$ ,  $p < .001$ ).

The majority of respondents had never smoked cigarettes on a regular basis (62.3%,  $n = 303$ ), and for those who smoked previously, 33.5% ( $n = 163$ ) no longer did so. Only 4.2% ( $n = 20$ ) of the sample were current cigarette smokers. There was no statistically significant difference between the two groups.

HIP respondents scored significantly higher on the SF-12v2© physical-component summary ( $M = 31.25$ ,  $SD = 11.04$ ) than their HACC ( $M = 29.27$ ,  $SD = 10.12$ ) counterparts,  $t(460) = 1.99$ ,  $p < .05$ . On the mental-component summary, HIP respondents again scored higher ( $M = 50.22$ ,  $SD = 12.26$ ) than HACC ( $M = 48.13$ ,  $SD = 12.37$ ), although in this case it was not statistically significant. Using the GDS-5 item scale it was determined that 70.0% ( $n = 312$ ) of all the respondents

**Table 1 Basic Demographics**

<b>Variable</b>	<b>HIP, n = 215</b>	<b>HACC, n = 291</b>	<b>Total, N = 506</b>
Age, <i>M (SD)</i>	82.2 (6.05)	82.1 (5.8)	82.2 (5.94)
Sex (%)			
female	84.8	75.3	79.3*
male	15.2	24.7	20.7
Marital status (%)			
married/de facto	29.5	33.4	31.8
widowed	55.7	53.7	54.5
separated/divorced	9.5	11.1	10.5
never married/other	5.3	1.8	3.2
Education (%)			
university degree	10.6	9.1	9.7
TAFE course	11.1	7.9	9.3
completed high school	37.2	41.5	39.6
quit before end of high school	41.1	41.5	41.3
Location (%)			
metro suburb	87.5	71.7	78.3
country town	8.7	26.2**	18.8
other rural	3.8	2.1	2.9
Housing status (%)			
own home, no mortgage	62.0	62.5	62.3
own home with mortgage	4.3	3.2	3.7
rent privately	3.4	7.1	5.5
rent/state housing	6.7	9.9	8.6
live in retirement village	20.2	14.8	17.1
other	3.4	2.5	2.9
Living status (%)			
alone	65.9	61.5	63.4
with spouse/partner	28.4	32.2	30.6
other	5.7	6.3	6.0

*Note.* HIP = Home Independence Program; HACC = Home and Community Care; TAFE = technical and further education.

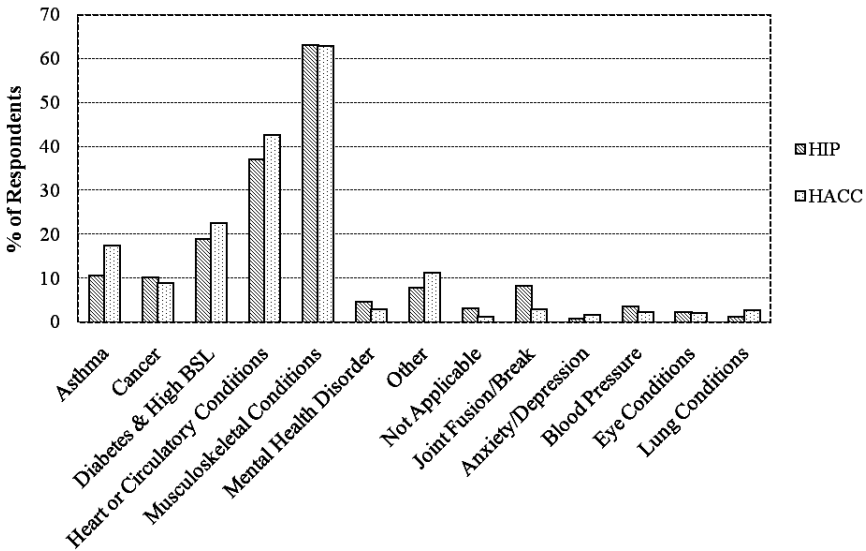
\* $p < .05$ . \*\* $p < .001$ .

were “not depressed” and the other 30.0% ( $n = 134$ ) needed additional screening to determine if they were. Differences between the service groups were negligible.

Survey respondents were asked how many chronic illnesses they had suffered over the last 12 months, and 40.4% ( $n = 187$ ) of respondents reported having had at least one chronic illness, with 33.2% ( $n = 90$ ) HACC respondents and 28.1% ( $n = 54$ ) HIP respondents reporting having been diagnosed with two. As illustrated in Figure 1, musculoskeletal conditions (including arthritis, osteoarthritis, and osteopenia) were by far the most prevalent for both service groups, with heart or circulatory conditions the second most common. Diabetes (including high blood sugar) and asthma were the only other two chronic conditions identified by more than 10% of the respondents. There were no statistically significant differences between the groups in terms of the proportions with different chronic illnesses.

Over a third of respondents, both HIP (36.6%,  $n = 68$ ) and HACC (41.6%,  $n = 102$ ), had a healthy body-mass index between 18.5 and 24.9. However, more than half of both HIP (54.8%,  $n = 102$ ) and HACC (53.8%,  $n = 132$ ) respondents were overweight or obese (25 and over). Less than 10% of the HIP (8.6%,  $n = 16$ ) and 5% of the HACC (4.5%,  $n = 11$ ) sample were underweight.

Eighty-two percent ( $n = 400$ ) of all respondents had trouble walking. When the proportions of HIP and HACC respondents who had trouble walking were compared with the proportion who had no trouble walking, no significant difference between the groups was found ( $\chi^2 = .13$ ,  $df = 1$ ,  $p = .722$ ). However, there was a significant difference in the proportion of each group who had trouble walking but did not use any aid ( $\chi^2 = 16.48$ ,  $df = 6$ ,  $p = .011$ ).



**Figure 1** — Chronic illness by home care service. HIP = Home Independence Program; HACC = Home and Community Care; BSL = blood sugar levels.

A third ( $n = 63$ ) of HIP clients, compared with 24.8% ( $n = 62$ ) of HACC clients, reported having been encouraged to be more physically active by their care manager. Thirty percent ( $n = 43$ ) of the HIP clients could recall being given an activity program as part of their home care service, whereas this was true for only 7.7% ( $n = 15$ ) of HACC clients. A significant difference was found between the HIP and HACC groups receiving a physical activity program ( $\chi^2 = 28.602$ ,  $df = 2$ ,  $p < .001$ )—HIP clients were 4 times more likely to receive a physical activity program than HACC.

The PASE data were found to be not normally distributed, so a square-root transformation was undertaken. All subsequent analyses used the transformed data because they were normally distributed. However, to allow for comparison with other studies, the original (untransformed) PASE scores are presented in Table 2. The mean PASE score for respondents in this study ( $n = 312$ ) was 83.98 ( $SD = 64.32$ ) and ranged from zero to 385. Using an independent  $t$  test, we found that HIP respondents were significantly more physically active ( $M = 93.4$ ) than the HACC clients ( $M = 77.9$ ),  $t(310) = 1.98$ ,  $p = .049$ .

Statistically significant differences were found between respondents' PASE scores at different ages,  $F(5, 303) = 5.71$ ,  $\eta_p^2 = .086$ ,  $p < .001$ . Tukey post hoc comparisons of the six age groups are illustrated in Table 3, which also shows which of the age groups had statistically significantly higher PASE scores (e.g., the 70- to 74-year-olds illustrated significantly higher PASE scores than the 90–94 and 95+ age groups).

**Table 2 Comparison of PASE Scores With Other Studies**

Reference	Population	Sample, $N$	Mean age, years	PASE score, $M$ ( $SD$ )
Current study	Home care clients	506	82.2	HIP: 93.4 (70.1); HACC: 77.9 (59.6); total: 83.98 (64.3)
Washburn et al., 1993	65+-year-old Americans living in rural and metro communities	314	73.0	102.9 (64.1)
Martin et al., 1999	65+-year-old people with knee pain and arthritis	471	71.7	131.4 (71.1)
Foldvari et al., 2000	70+-year-old women living independently with functional impairments and had 1+ fall	78	74.8	94.5 (45.5)
Roth, Goode, Clay, & Ball, 2003	65- to 95-year-old Americans	140	74.5	97.3 (61.9)
Fabre et al., 2010	50+-year-olds attending local community groups for seniors	286	74.2	109.3 (64.4)

*Note.* PASE = Physical Activity Scale for the Elderly; HIP = Home Independence Program; HACC = Home and Community Care.



**Table 3 Comparison of Tukey's Honestly Significant Difference for PASE (THSDP) Across Age Groups**

Age group (years)	THSDP
70–74	113.49 <sub>a</sub> (88.68, 138.31)
75–79	92.69 <sub>a</sub> (77.78, 107.61)
80–84	85.71 <sub>a</sub> (74.55, 96.86)
85–89	74.47 <sub>a,b</sub> (60.67, 88.27)
90–94	54.96 <sub>b</sub> (21.63, 88.30)
95+	42.33 <sub>b</sub> (1.92, 82.74)

*Note.* PASE = Physical Activity Scale for the Elderly. Means that share a subscript letter are not significantly different from one another at  $p < .05$  in the comparison. Numbers in parentheses are 95% confidence intervals of the means.

Respondents' PASE scores differed significantly according to their mobility status,  $F(4, 305) = 28.92$ ,  $\eta_p^2 = .275$ ,  $p = .001$ . Table 4 outlines the significant differences found in mobility levels (e.g., respondents who had no trouble walking showed significantly higher PASE scores than all other mobility groups).

Respondents who were not depressed on the GDS-5 had significantly higher PASE scores than those who reported symptoms of depression,  $t(289) = 5.97$ ,  $p < .001$ . Thus, we are 95% confident that home care clients who are not depressed will have a PASE score 23.95–53.62 points higher than those who are depressed. Using the Pearson product–moment correlation coefficient, a significant positive linear relationship between (transformed) PASE scores and the SF-12v2© physical-component summary score was found ( $r = .45$ ,  $p < .001$ ). Somewhat similar results were found for the SF-12v2© mental-component summary score, where the Pearson product–moment correlation coefficient was calculated as  $.18$  ( $p < .001$ ), showing a weak positive linear relationship between PASE scores and mental capacity.

The multiple-response analysis used transformed PASE data to identify respondents' characteristics most likely to be associated with who is physically active, as shown in Table 5. Service type (HIP vs. HACC), level of education, and chronic illness were initially included in the analysis; however, they were found not to be significant predictors. The results showed that people of younger age, with a higher SF-12v2© physical-component score, and who have little trouble walking and do not present with a diagnosis of depression were most likely to be physically active compared with home care clients who were older, had lower SF-12v2© physical-component scores and difficulty in walking, and suffered from depression.

Using the formula described in the Methods section to determine whether respondents were physically active for the recommended minimum 30 min of moderate exercise each day (Australian Government Department of Health and Ageing, 2009b), we found that 77.7% ( $n = 307$ ) of all respondents met that criterion. Over three quarters of both HIP (76.7%,  $n = 135$ ) and HACC (78.5%,  $n = 172$ ) respondents were sufficiently active as defined by the Australian government's recommendations. The difference between them was insignificant. These results do not include the household activities included in the PASE. When examining the

**Table 4 Comparison of Tukey's Honestly Significant Difference for PASE (THSDP) Across Mobility Levels**

Level of mobility	THSDP
No trouble	145.09 <sub>a</sub> (119.55, 170.63)
Trouble but no aid used	94.38 <sub>b</sub> (84.52, 104.23)
Use cane/walking stick or frame outside house	63.84 <sub>c</sub> (55.42, 72.26)
Use cane/walking stick or frame inside house	36.49 <sub>d</sub> (23.29, 49.69)
Use wheelchair inside house	14.37 <sub>c,d</sub> (-5.75, 34.50)

*Note.* PASE = Physical Activity Scale for the Elderly. Level of mobility is about walking. Means that share a subscript letter are not significantly different from one another at  $p < .05$  in the comparison. Numbers in brackets are 95% confidence intervals for the means.

**Table 5 Respondents Most Likely to Be Physically Active**

Variable	<i>B</i>	<i>SE B</i>	<i>p</i>	<i>CI</i>
Age	-1.642	0.557	<.001***	-2.739, -0.545
SF-12v2© Health Survey physical-component summary	1.880	0.360	<.001***	1.171, 2.588
No trouble walking	82.633	28.333	<.001***	26.858, 138.409
Trouble walking but do not use an aid	55.052	27.092	.002**	1.720, 108.384
Need cane/walking stick or frame to walk outside of home	47.240	26.848	.007**	-5.608, 100.097
Need cane/walking stick or frame to walk inside of home	26.746	28.259	.160	-28.884, 82.377
Geriatric Depression Scale-5 item	20.282	6.964	<.001***	6.572, 33.992

*Note.* The scores presented in the table use original data from the Physical Activity Scale for the Elderly to allow for comparison with other studies. Adjusted  $R^2 = .342$  ( $p < .001$ ).

\*\* $p < .01$ . \*\*\* $p < .001$ .

household activities of both home care groups, more HIP respondents (94.1%,  $n = 159$ ) completed household activities than their HACC counterparts (92.2%,  $n = 226$ ); however, this difference was also small and not significant.

## Discussion

The total PASE scores indicated that the HIP group was more physically active than individuals in the HACC group. However, HIP and HACC were not found to be predictors of activity level when other variables were adjusted for in the multiple regression.

When comparing this study with others that used the PASE with community-dwelling older people (see Table 2), PASE scores for this study were generally

lower. However, the mean PASE score of the HIP group was comparable to that found by Foldvari et al. (2000) when investigating a group of women, age 70 years and older, who had a minimum of one functional impairment and had experienced at least one fall. Subjects of the other PASE studies identified had lower mean ages, which could explain the higher PASE scores.

The factors found to best predict an older home care client's being physically active were being younger, having a higher physical-component score, having little or no trouble walking, and not being depressed. These findings are consistent with other research: Rhodes et al. (1999) found that older people with perceived physical frailty and poor health were less likely to be physically active, Boyette et al. (2002) also found good health to be important in being physically active, and a recent study by Giuli, Papa, Mocchegiani, and Marcellini (2012) found that older community-dwelling Italians who were younger and had a lower body-mass index, better health status, and an absence of depression were more likely to undertake regular physical activity.

The positive effect of physical activity on depression has been well reported (Craft & Perna, 2004; Harvey, Hotopf, Overland, & Mykletun, 2010; Strawbridge, Deleger, Roberts, & Kaplan, 2002). It is also thought that those who suffer from depression are less likely to be physically active, although the evidence for this is less clear (Roshanaei-Moghaddam, Katon, & Russo, 2009). Our findings are consistent with this latter concept; we found that older home care clients who are not depressed are more likely to be physically active than those who are depressed.

The majority of participants met the recommended levels of physical activity prescribed by the Australian government (Australian Government Department of Health and Ageing, 2009a; Sims et al., 2010). The proportion of HACC clients who met the recommended levels was slightly, but not significantly, higher than the proportion of HIP clients. While this finding appears immediately at odds with the HIP group's having higher PASE scores than the HACC group, it is understandable given that, as explained earlier, household and other activities that form part of the PASE were not included in the determination of whether an individual met the recommended activity level. The HIP program focuses on helping people return to independence by doing as much as they can themselves, whereas the traditional home care model, here represented by HACC, has been to take over tasks with which people are having any difficulty. It is perhaps a direct function of the different service models that fewer HACC clients engaged in activities of daily living despite being more likely to exercise, as the traditional service model reduces older individuals' opportunities to be active and retain functional fitness and promotes further loss of independence.

The Australian and WHO physical activity recommendations do actually include the promotion of everyday activities such as housework, gardening, and walking to the shops for older people, but only in the longer version of the recommendations. Unfortunately, this is not the version used by the media in community campaigns, which tend to focus on increasing the amount of exercise taken rather than doing more housework or walking to the shops. Our research has illustrated the importance of incidental activity in increasing activity levels. If these activities were promoted in the community as being important contributors to aging well and maintaining independence, older individuals and their families may be less inclined to have a home care agency come in and take over household tasks, and

the home care agencies may be motivated to develop models of care that promote independence through helping people maintain or increase their engagement in everyday activities.

While more individuals in the HIP group engaged in everyday activities, as noted, slightly fewer exercised to a level that met the minimum government-recommended level. Yet more of the HIP group had been encouraged to be more physically active and were given an exercise program as part of the service provided. This suggests that exercise programs are not well maintained over time and that activity programs that are based around everyday activities, such as Clemson et al.'s (2010) LiFE program, may have greater impact in the long term. This requires further investigation.

This study had two limitations: the relatively low response rate, which resulted in a smaller than predicted sample size, and the large number of questionnaires returned for which it was not possible to score the PASE. The initial sample-size calculations determined that 335 respondents from each home care service (or 670 in total) were required for the study to have sufficient power to identify a statistically significant difference between the groups, given the effect size expected. Only 506 in total were returned, and of these, fewer were returned by HIP clients than by HACC clients. However, there is no reason to believe that the smaller proportion of HIP clients responding reflects any particular response bias. It was not possible to confirm this, however, as the survey was anonymous and we were therefore unable to determine whether responders were different from nonresponders. As for the smaller number of HIP regional respondents, this is thought to simply reflect the fact that few restorative care services exist in regional areas, rather than a smaller proportion of regional HIP clients having responded.

One hundred ninety-four questionnaires were either not fully completed or completed incorrectly for the PASE questions, which may limit the generalization of these results. It also indicates that there is a need for further research to identify the reasons for incompleteness and whether the tool is useful delivered in this format to this population. A direct measure of activity could potentially provide a more complete data set, but the PASE was chosen because of its demonstrated reliability when administered by mail-out to older people (Washburn et al., 1993). Another advantage of using the PASE in this study was that it included household activity and work-related activity and thus allowed us to see the differences between the groups in terms of their pattern of activity. Because there were similar numbers of incomplete PASEs in each group (HIP  $n = 92$ , HACC  $n = 102$ ), there is no reason to believe that the number of incomplete surveys introduced bias.

## Conclusion

This study found older home care clients who received a restorative home care service (HIP) to be more physically active overall than individuals who received "usual" home care (HACC). However, despite being more likely to have been encouraged to be physically active and to receive a physical activity program as part of the service, they were slightly less likely to be exercising sufficiently to meet the government-recommended activity levels. This, together with the fact that home care group did not predict activity level when other variables were taken into account, suggests that the current exercise component of the restorative program does not

have a sustained impact on activity levels, and investigation of the effectiveness of alternative everyday activity-based programs is warranted.

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