The effect of home care on the ability to perform the activities of daily living and the well-being of older people

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Abstract With the considerable changes in population age-profiles, the preventive care of older people is becoming more and more important. We analyse the long-term effect of the provision of home care on the recipient's ability to perform the activities of daily living (ADLs) and upon aspects of their well-being. Using regression analysis on a set of Danish longitudinal data featuring people aged 67–77 we estimate the effect of home care while controlling for initial health, including initial ADL ability and well-being, along with demographic and socioeconomic conditions. We find no effect of home care on ADL ability in women; results for men, however, indicate a negative association. The provision of home care has an insignificant effect on women's well-being, but a positive effect for men incapacitated beyond a certain degree. Results indicate a need for supplementary efforts to protect against the disablement process.

Keywords Home care · Older people ·
Capacity of daily living · Well-being

Introduction

Denmark is one of the few countries in the world in which it is possible to receive free public assistance when one's only need is help with housekeeping. Compared to other Western countries, a larger proportion of older people in Denmark receive publicly funded home care (see, e.g. Nielsen and Andersen 2006). This may reflect the basic

idea of Danish welfare policy, which is to strengthen the individual's integrity and independence by intervening before his or her resources are exhausted (Esping-Andersen 1990). However, the provision of public help to older people with a reduced ability to perform the activities of daily living (ADLs) may have both positive and negative effects.

In their model of the disablement process Verbrugge and Jette (1994) describe how chronic and acute conditions affect the functioning of specific body systems, the performing of physical and mental actions and activities involved in daily living. The model includes individual and environmental factors that accelerate or retard disablement, external assistance being considered an extra-individual factor having a protective effect on the disablement process. Such assistance is, however, expected to have no immediate effect on pathology, but may, however, affect the onset of disability. Adequate professional home care may prevent behaviour with pernicious consequences; such as adopting a passive life style due to chronic conditions. Providing assistance that encourages self-help may contribute to maintaining the ability to perform daily chores. We expect such an effect to appear in the longer term, by preventing a decline in physical functioning. Conversely, if assistance is provided in a manner that makes recipients less active, such as the home help doing daily chores that recipients could do themselves, it may make people passive and have a negative effect on their ADL ability.

Disablement has consequences for people's well-being (Verbrugge and Jette 1994), and, if home care has an effect on disablement, it may also affect well-being. Furthermore, public help in Denmark is considered a safety net and as such aims to maintain a certain standard of living and peace of mind among recipients. It can thus be argued that public home care has a positive effect on well-being (e.g.

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Mulatu and Schooler 2002). However, if dependent people feel they receive inadequate help, it may lead to psychosocial distress, which, e.g. Mulatu and Schooler (2002) find is connected with worse health.

The limited empirical literature on the effect of home care indicates that home care either has no effect or a deleterious effect on the recipient's ADL ability and well-being. We give an overview of this literature below. Studies of special home-care services and studies of selected groups are not considered.

Hedrick and Inui (1986) conclude that home-care services have no impact on mortality, patient functioning or nursing-home placements (the length of the observation period is not listed), and a Canadian study (Contandriopoulos et al. 1986) finds that home aid services have no significant effect on the use of hospital services or other services. The review by Hedrick et al. (1989) concludes that there is a small, beneficial effect of home care on mortality, although this falls short of statistical significance; there is stronger evidence of a reduction in nursing-home placements. The real issue is whether this reduction is caused by an effect on people's ability to function or by the fact that higher needs can be taken care of in someone's own home after a home-care programme has been introduced. Another Canadian study (HSURC 2000) finds that people receiving preventive home care over a period of 6 years are more likely to lose their independence or to die than people not receiving this service over a period of 6 years.

Godfrey et al. (2000) conclude that there is evidence of reduced ADL abilities, but a positive and significant impact on users' life satisfaction among individuals receiving home-care. This review also asserts that the evidence of improvement in subjective physical and mental health is inconclusive and that Homemaker/Home-care programmes including long-term comprehensive services may be associated with lower mortality (the observation periods are not stated). Barberger-Gateau et al. (2004) find a 'protective' effect of home care against death from severe disability during a ten year follow-up period, but the provision of home care was associated with a lower chance of recovering full autonomy.

Only one study reports a positive effect on functioning due to home care. On the basis of a natural experiment taking place in British Columbia, Hollander and Tessaro (2001) studied the effect of home care on mortality and expenditure in a 6-year follow-up period. The study found a subsequent higher mortality and higher health service expenditure among low level home-care clients who had suffered cutbacks in home care services. The amount of expenditure is taken as an indicator of the condition of the recipient's health. However, it is not clear whether the

differences in mortality and expenditure are due to the lower level of help or to the reduction in the level of help.

The present paper aims to add to the literature on the correlation between home care including help with housekeeping and personal care for older people and their subsequent ADL abilities, and aspects of well-being as well as discussing causal mechanisms underlying these correlations. We analyse possible consequences of the frequency of help; most former studies have merely distinguished between home care and no home care.

Methods

Population studied and design of study

The study population is a set of data taken from the Danish Longitudinal Study of Elderly People, which is based on personal interviews carried out in 1997 with a representative sample of cohorts born in 1920, 1925, 1930, 1935, 1940 and 1945. The sample for the analyses in this paper is based on people born in 1920, 1925 or 1930 (aged 67, 72 or 77 in 1997), who had retired from the labour market, and who lived outside institutions in 1997. This includes 1,867 persons (response rate = 69%), 1,317 (70.5%) of whom participated in the follow-up interview in 2002 (including people in institutions). We focus on the three older cohorts, since very few of the younger cohorts had home care in 1997. Of those who did not participate in the follow-up interview, 17.8% had died and the remaining 11.7% declined to be interviewed. Failure to participate in the follow-up interview is, not surprisingly, larger among older cohorts and people with weaker initial health. Participants in the 1997 interview did not differ from participants in the 2002 follow-up interview regarding type of occupation before retirement. Among the 550 non-respondents of the follow-up interview, the share with only basic general education is a little larger (46% compared to 42% for respondents), but this is mainly due to older cohorts having less education.

In 1997 a total of 284 people in the sample received home care including help with housekeeping or with personal care. This corresponds to 15% of the sample, while 13.4% of the Danish population aged 67–79 received home care in 2006. Of the 284 recipients of home care in 1997, 132 (46.5%) took part in the follow-up interview in 2002. Attrition among those receiving home care in 1997 is thus relatively higher than among those not receiving home care. This is explained by higher mortality during the five-year period among those receiving home care in 1997. This is not surprising, since persons receiving home care tend to be older and have more initial health problems. When

interpreting the results, one must keep in mind that the analyses apply to five year survivors only.

Administrative data for 1997 were merged with the interview-based dataset using social security numbers. The administrative data includes all persons in the interview-based dataset. However, due to missing data for some of the included interview-based variables, the number of observations is reduced by 50 in the model for ADL incapacity, and further reduced by an additional 19 observations in the model for well-being.

Measures

Outcome variables

Index of incapacity (IOI). A variety of instruments and methods is available for assessing the functional ability of older adults. Katz' activities of daily living index (ADL), Lawton's instrumental activities of daily living index (IADL), and Shanas' index of incapacity (IOI) are some of the better known and more widely used (Katz et al. 1970; Lawton and Brody 1969; Shanas et al. 1968). Katz' ADL index measures severe conditions, and is most relevant for people living in institutional settings, while IADL scales have a wider focus than physical function alone and assess life-management when confronted by physical limitations. Therefore, in this case, as in former Danish surveys (e.g. Platz 1981; Platz 1990; Hansen and Platz 1995) Shanas' index was chosen. This index is based on six ADLs that an older person has "to perform and the faculties he would have to employ to maintain life, assuming he received no assistance" (Shanas et al. 1968, p. 26). These activities are as follows: (1) cutting ones own toenails, (2) walking up and down stairs, (3) walking out of doors, (4) getting about the house, (5) washing and bathing oneself, and (6) dressing oneself and putting on shoes. For each question, respondents who answered 'are able to without any difficulty' scored 0; respondents who answered 'are able to, but only with difficulty' scored 1; and respondents who answered 'cannot without help' scored 2. The index for incapacity therefore ranges from 0 to 12, with value 0 representing full capacity and value 12 representing a high degree of incapacity (Cronbach's alpha 0.9).

Well-being. The respondents were asked five different questions about their psychological well-being. The answers 'often' or 'occasionally' to questions: (1) "How often do you feel afraid of certain things?", (2) "How often are you anxious?", (3) "How often are you depressed?" and (4) "How often do you feel lonely?" were assigned a value of 1, and the answers 'rarely' and 'never' to question: (5) "How often do you feel in high spirits?" were also assigned a value of 1. We then constructed an index ranging from 0 to 5. The value "0" represents no problems

with any of the five aspects of well-being while "5" represents severe problems with the aspects of well-being included in the questionnaire (Cronbach's alpha 0.61). These questions are similar to questions in the extensive SF-36 Health Survey developed with the aim of creating a yardstick for well-being as well as functional ability, physical, and mental health (Ware and Sherbourne 1992). The measurement of well-being used in this paper does not incorporate all the questions used in the SF-36 Health Survey, but it captures aspects that have been shown to be of importance to overall well-being. Similar questions are used in the European Social Survey designed to measure, among other things, well-being and health.

Variables of help

The variable expressing the amount of home care provided is based on interview data. A variable representing help given by relatives or others was also constructed. A further variable expresses whether a person assesses that he or she needs (more) home care.

Home care. Respondents were asked if they received home care and, if so, on which weekdays and how many times a day. We then aggregated the number of visits per day and days per month into a total. Respondents who did not receive home care were assigned a value of 0, and respondents receiving help once every two weeks were assigned a value of 2. The index ranges from 0 to 168 visits a month.

Help from others. Respondents were asked if, within the latest month, they had received help from children, family or friends (excluding people they live with) in cleaning and maintaining their home, dealing with financial affairs, getting to treatment facilities, or getting outside of the home. Respondents answering yes to at least one of these questions were given a value of 1, while respondents answering no to all questions were given a value of 0.

Need of (more) home care. Respondents who did not receive home care were asked if they needed it, and respondents who did receive home care were asked if they needed more help. Respondents answering yes to one of these questions were said to be in need of (more) home care.

Other variables

To control for base-line differences in help dependency between people receiving home care, and people not receiving it, a large number of variables associated with disablement (see, e.g. Avlund 2004) were included in the analyses. Controlling for a very broad range of personal characteristics, including initial health, demographic and socioeconomic conditions and social networks, is

important in order to expose any estimated (conditional) correlation between home care and later health-related outcomes as causal. Together with the variables described above, the additional controls are listed in the appendix with descriptive statistics, and are summarized as follows.

Initial health. IOI, well-being, provision of home nursing, self-assessed health, and a history of specific ailments (high blood pressure, diabetes, asthma, osteoarthritis, myalgia, osteoporosis, back diseases, depression). In addition, we included administrative data for 1997 and 1992–1997 showing the number of: contacts with GPs and specialists, number of hospital admissions, and days of hospitalization.

Social network and whether the person is *involuntarily alone* (being alone often or now and then even though he or she would prefer to be with others) in 1997.

Demographic and socioeconomic controls. Gender, age, education, type of job when the person was working, and (from the administrative data) income.

Statistical methods

We used the ordinary least squares (OLS) method (applying SAS®). Estimations were made separately for men and women, since numerous studies have found gender differences in the various steps in the pathway leading to functional limitations and disability (see, e.g. Avlund 2004; Newman and Brach 2001; Mor et al. 1989). Also, gender differences are significant in the estimated coefficients of many variables, and these differences were controlled in running regressions including gender interaction effects.

The explanatory variable of primary interest in the model is the number of home help visits received per month in 1997. Other basic explanatory variables include initial IOI and well-being values in 1997, and an interaction term between IOI in 1997 and the number of home help visits, allowing the effect of home care to depend on initial ADL ability. For instance, home care might have a greater effect for people with low initial ADL abilities. Some older people will, as an alternative or supplement to public help, receive help from family or friends, while a few pay for help from a private firm (e.g. Hansen et al. 2002; Larsson et al. 2006). We therefore control for help supplied by relatives and friends. Two other variables are closely related to home care, namely an indicator for whether the person needed (more) home care, and a variable for the level of frequency of receiving help from a nurse (never, less than once per week, once per week, and more than once per week).

These basic explanatory variables were included in all regressions (except for some robustness checks; see below). In addition, the models include, as controls, variables for 1997 which might have an effect on the

dependent variables of ADL inability and well-being in 2002, and which may be associated with the initial amount of help in 1997 (all variables are listed in the appendix). Since we include many controls for initial conditions, some of these may be statistically insignificant due to multicollinearity. This is not a problem for the analysis since these controls simply serve to help in isolating the causal effect of home care. Thus, we focus on the effect of home help, not on the effects of each separate control for initial conditions.

First, we estimated the models with the full set of controls. Then we estimated more parsimonious models retaining all basic explanatory variables, but excluding additional controls with *t* values below 1 (numerically). We show results for these parsimonious models, but the estimated effects of home care are not significantly different in the models with the full set of controls.

Multi-collinearity problems may arise since the models include both the home care variable and its interaction with IOI at base line. Therefore, we also estimated the models without this interaction term. As further robustness checks we estimated other versions of the model: (1) omitting people without incapacity problems in 1997 (since they cannot improve their capacity); (2) including only people with modest incapacity (since for people with severe incapacity the home care might take a different form and have other effects than for people with only modest problems); (3) using categorised variables for the number of home help visits (since the effect of home care might not be linear); (4) including only people living alone (since home care is granted on the basis of the total needs of the household and some people might receive home care mainly on the basis of their spouse's needs).

Results

Table 1 shows results of our estimations of ADL inability. The frequency of home help visits to female recipients does not have a significant effect on the level of ADL inability over the next 5 years. For men the interaction term between home care and base-line IOI is marginally significant (it is significant at the 10% level, but not at the 5% level) and positive, and the main effect of home care is positive (although insignificant). This indicates that there is a negative association between home care and subsequent ADL ability for men, and that this association is stronger when capacity in ADL at base line is smaller.

Women who believed that they needed (more) home care in 1997 had a higher ADL ability in 2002 than women who believed they received sufficient help in 1997.

Table 2 shows estimation results for well-being in 2002. We observe distinct differences in the results for men and

Table 1 Results of estimation on ADL inability for men and women

Dependent variable: index of incapacity 2002	Men		Women	
	Estimate	Standard error	Estimate	Standard error
Home help visits 1997	0.007	0.017	0.012	0.013
Home help visits 1997 $\times$ IOI 1997	0.010*	0.005	−0.002	0.002
Help from others 1997	0.565***	0.204	−0.209	0.179
Need of home care 1997	−0.062	0.306	−0.406***	0.251
IOI 1997	0.602***	0.073	0.683***	0.056
Well-being 1997	0.100	0.088	0.049	0.071
Nurse 1997	0.691***	0.266	0.261	0.231
Self assessed health good 1997	Reference		Reference	
Self assessed health medium 1997	0.608***	0.183	0.661***	0.196
Self assessed health poor 1997	0.480	0.346	0.255	0.346
Raised blood pressure	−0.785**	0.339	–	–
Asthma	0.315	0.273	1.106***	0.275
Osteoarthritis	–	–	−0.258	0.178
Myalgia	−0.647**	0.279	–	–
Depression	–	–	−0.457	0.342
Osteoporosis	2.158	1.798	0.435	0.322
Contacts with GPs and specialists 1997	0.007**	0.003	–	–
Contacts with GPs and specialists 1992–1997	–	–	0.002***	0.001
Hospitalisation 1997	–	–	0.195	0.143
Hospitalisation 1992–1997	0.142***	0.033	–	–
Days of hospitalisation 1997	−0.041**	0.017	–	–
Days of hospitalisation 1992–1997	–	–	0.014**	0.006
Social network strong	Reference		Reference	
Social network medium	0.456***	0.158	0.016	0.163
Social network weak	0.126	0.228	−0.379	0.271
Involuntarily alone 1997	−0.291	0.254	–	–
Age 67	Reference		Reference	
Age 72	0.151	0.163	0.181	0.174
Age 77	0.388**	0.186	0.531***	0.195
Blue-collar worker	Reference		Reference	
White-collar worker	−0.408**	0.171	−0.278	0.174
Self-employed doctor, lawyer etc.	−0.186	0.264	−0.567***	0.189
Self-employed agriculture, fishing etc.	−0.396**	0.202	−0.127	1.084
Living alone	0.372*	0.193	0.325**	0.154
Intercept	0.022	0.183	0.162	0.197
<i>N</i>	606		661	
<i>R</i> ²	0.400		0.484	
<i>F</i> value, Probability > <i>F</i>	15.45, <0.0001		24.87, <0.0001	

Significance level: * at 10%, ** at 5%, *** at 1%

women concerning the correlation between home care in 1997 and well-being in 2002. For men without or with only a few incapacity problems in 1997, increasing home care seems to have a negative effect on well-being in 2002. However, this effect is reversed for men scoring more than three on the incapacity index for 1997, due to the positive contribution from the interaction variable of home help visits and IOI in 1997.

For women, the correlation is the opposite, since the coefficient of home care in 1997 is negative (although insignificant), whereas the interaction term with IOI in 1997 is positive (but only marginally significant). Thus, for women with IOI less than three in 1997, the effect of an increase of home care on well-being in 2002 is positive (but insignificant). For women with IOI larger than three, the effect is negative.

Table 2 Results of estimation on well-being for men and women

Dependent variable: well-being in 2002 (the index of well being is high when well-being is low)	Men		Women	
	Estimate	Standard error	Estimate	Standard error
Home help visits 1997	0.019**	0.009	−0.005	0.008
Home help visits 1997 × IOI 1997	−0.006**	0.003	0.002*	0.001
Help from others 1997	0.032	0.109	−0.154	0.100
Need of home care 1997	0.080	0.164	0.020	0.145
IOI 1997	−0.014	0.038	−0.025	0.033
Well-being 1997	0.359***	0.045	0.315***	0.043
Nurse 1997	0.082	0.138	0.130	0.137
Self assessed health good 1997	Reference		Reference	
Self assessed health medium 1997	0.350***	0.099	0.420***	0.113
Self assessed health poor 1997	0.218	0.188	0.086	0.201
Asthma	−0.156	0.149	0.301*	0.158
Osteoarthritis	−0.206**	0.104	–	–
Myalgia	–	–	0.272**	0.123
Depression	0.602*	0.333	0.281	0.200
Contacts with GPs and specialists 1997	0.002	0.002	–	–
Contacts with GPs and specialists 1992–1997	–	–	0.001***	0.000
Hospitalisation 1997	0.058	0.050	–	–
Days of hospitalisation 1992–1997	–	–	−0.007**	0.003
Social network strong	Reference		–	–
Social network medium	0.192**	0.084	–	–
Social network weak	0.038	0.121	–	–
Involuntarily alone 1997	–	–	0.425***	0.115
Age 67	Reference		Reference	
Age 72	0.016	0.088	0.114	0.101
Age 77	−0.014	0.102	0.094	0.110
Basic general education	Reference		Reference	
Upper secondary level/vocational	0.144	0.094	0.110	0.102
Short-cycle higher education	0.323	0.231	−0.261	0.296
Medium-cycle higher education	0.419**	0.179	0.105	0.168
Long-cycle higher education	0.363*	0.186	0.197	0.444
Blue-collar worker	Reference		Reference	
White-collar worker	−0.119	0.106	−0.123	0.115
Self-employed doctor, lawyer, etc.	−0.082	0.146	−0.221**	0.110
Self-employed agriculture, fishing, etc.	−0.142	0.118	0.180	0.623
Income 1997	0.014*	0.007	–	–
Living alone	0.139	0.106	–	–
Intercept	0.333**	0.151	0.396***	0.108
<i>N</i>	599		649	
<i>R</i> ²	0.238		0.289	
<i>F</i> value, Probability > <i>F</i>	6.61, <0.0001		10.58, <0.0001	

Significance level: * at 10%, ** at 5%, *** at 1%

Because of the interaction term between home care and IOI in 1997 the estimated effect of home care depends on the IOI value in 1997. Table 3 summarizes the effects of home care for each value of IOI (which varies between 0 and 12) in each of the four regressions in Tables 1 and 2.

The interaction term is most significant in the model of well-being for men, where the effect of one additional home help visit per month varies from 0.02 when IOI in 1997 is 0 (i.e. when there are no capacity problems) to −0.06 when IOI in 1997 is 12.

Table 3 Effects of an increase in home care of 1 visit per month on the index of incapacity (IOI) in 2002 and well-being in 2002 for each value of IOI in 1997

IOI in 1997	Effect on IOI in 2002		Effect on well-being in 2002	
	Men	Women	Men	Women
0	0.007	0.012	0.019	−0.005
1	0.017	0.010	0.013	−0.003
2	0.026	0.009	0.006	−0.001
3	0.036	0.007	0.000	0.000
4	0.046	0.006	−0.006	0.002
5	0.056	0.004	−0.013	0.004
6	0.066	0.002	−0.019	0.006
7	0.075	0.001	−0.025	0.008
8	0.085	−0.001	−0.032	0.009
9	0.095	−0.003	−0.038	0.011
10	0.105	−0.004	−0.044	0.013
11	0.115	−0.006	−0.051	0.015
12	0.124	−0.007	−0.057	0.017

The effect of an increase in home care of one visit per month for a given value of IOI in 1997 is equal to the coefficient of home help visits plus the coefficient of the interaction term times the value of IOI in 1997

Discussion

In conclusion, this study does not support the hypothesis that the frequency of home help visits or small amounts of home care has a protective effect on ADLs. For women we find no significant relation between the frequency of home help visits and subsequent ADL abilities, while for men our results indicate a negative association between the frequency of home help visits and subsequent ADL ability, especially when initial ADL ability is low. We find a positive correlation between the frequency of home help visits and well-being five years later, but only for men with reduced ADL ability. Excluding the interaction effect between home care and initial IOI implies that the effect of home care on subsequent IOI becomes positive and statistically significant for men, while remaining insignificant for women. Excluding the interaction term in the model for well-being in women implies that the association between home care and subsequent well-being becomes clearly insignificant.

The main results are robust when the sample is restricted to subgroups: omitting people without ability problems in 1997, including only people with modest ability problems in 1997, and including only people living alone.

In Denmark, help from relatives and friends usually supplements home care from local authorities (Hansen and Platz 1995) and we find that help from relatives and friends is correlated with a subsequent lower ADL ability in men but not in women. This result differs from general findings that social support has a protective effect on functional

ability (Avlund 2004). We find no correlation between help from relatives or friends and subsequent well-being.

Selection effects are a possible reason why we find no significant protective effect on ADL ability. Thus, since the severity of health problems is correlated with the frequency of home help visits, our estimates may be biased if we do not control adequately for initial health. Even though we have a high quality of data and include many controls for initial health, we cannot completely rule out health selection effects.

A further reservation concerns ‘measurement errors’ which might bias our estimates of home-help effects towards zero. The home-care variable does not precisely express the amount of home care that a person receives. The variable expresses the number of visits per month, but not the (average) length of visits. Furthermore, we compare people with a varying frequency of home-help visits at a given time, and this frequency may have changed during the 5-year follow-up period.

The finding that the availability and frequency of home help visits have no significant overall protective effect on older people’s subsequent ADL ability may be explained by counteracting causal mechanisms, specifically a positive preventive effect and a negative effect if home care makes older people more passive. The fact that a possible positive preventive effect does not dominate the correlation is in line with the results of several other studies (e.g. Hedrick and Inui 1986; HSURC 2000; Godfrey et al. 2000). In fact, only a single study (Hollander and Tessaro 2001) suggests that the level of home care has a preventive effect on inability to perform ADLs. Depending on the degree to which assistance in self-help is adopted, home care might lead to increased or decreased ability to perform ADLs. An earlier study of Danish home care states that the principle of ‘help to self-help’ has not been put into practice (Swane 2003).

The desire to remain independent and self-reliant is widespread among older people (e.g. Lum et al. 2005; Hansen et al. 2002). However, the desire to remain independent may be less strong among those receiving (a small amount of) home care than among those receiving no help. Recipients of home care may be more inclined to leave daily chores to others and thereby be at risk of reducing their ability to perform ADL more rapidly due to inactivity.

The pathological processes leading to increased disability are only slightly affected by the receipt of home care. Thus, the progression of a number of diseases is independent of the amount of home care or the way it is supplied; these include dementia, heart diseases, arthritis and reduced sight.

There appears to be a positive effect on subsequent ADL ability for women who consider that they need (more) home care. Other things being equal, the propensity to receive home care is lower for women than for men (e.g.

Hansen et al. 2002; Larsson et al. 2006). Women must therefore generally be assumed to suffer greater reductions in their ability to perform ADLs before they can bring themselves to apply for home care. Consequently, women who assert that they need (more) home care may—compared to men—experience some difficulty in doing the daily chores themselves. Despite that, it is likely that they will try to do the chores because they find them important to satisfy their own standards of a proper home. In this respect, too, they may differ from older men. The physical labour involved in carrying out the chores may help them to maintain their capacity (Jackson 1996).

Home care seems to have a different effect on well-being for men and women. Men with reduced ADL abilities benefit from receiving home care, but women do not. A positive effect of home care on mental health is reported by Lum et al. (2005), but they report no gender differences. A positive effect on user's life satisfaction is reported by Godfrey et al. (2000), but the studies they review have not consistently considered the effect on well-being, and gender differences are not examined. In both Lum et al. (2005) and the studies reviewed in Godfrey et al. (2000) the outcome variables resembling well-being are reported at the time of receiving home care. To make the assertion of causality more plausible, in our study the outcome is well-being in a 5-year-perspective given well-being, health conditions, etc., at base line.

The different effect for men and women may be explained by the fact that different factors influence men and women who do not feel well. Men may worry about getting appropriate care in case of illness and incapacity, and the more help they get the less likely it is that they will develop greater anxiety and depression (Mulatu and Schooler 2002). Visits from home helps may maintain their spirits. Women may have the same worries and may benefit from receiving home care for daily chores and personal care, but at the same time they may have stronger feelings than men for independence and self-sufficiency in daily chores. Therefore, they may have greater worries about losing their independence in a

number of daily chores (referring to women being less inclined to receive home care (Hansen et al. 2002; Larsson et al. 2006)), but more often express a need for more home care (Hansen et al. 2002), and they may not benefit as much from receiving visits from home helps.

The results of this study are in line with most previous studies in the field. However, we find gender differences. For women we find no correlation between the frequency of home help visits and subsequent ADL abilities; for men the results indicate a negative correlation. For women the frequency of home help visits seems to have neither an activating effect nor any effect of making the recipients passive. For men the results indicate that a higher frequency of home help visits may make recipients more passive. The results are not an argument against supplying home care to disabled older people, but do indicate a need for supplementary efforts to protect against further disablement. However, further studies controlling for selection mechanisms are needed.

The observation that there may be a positive effect on subsequent ADL abilities when women claim they need (more) home care suggests that help should be granted on the basis of a careful assessment of older people's actual ability to perform daily chores. Having to take care of daily chores may contribute to retaining ADL abilities.

Although the Danish model is generous in supplying help to older people who only need help with housekeeping, the results may apply in other settings, since our results do not merely concern people with little help, and the type of home care supplied in the Danish model is much like help in other Western countries.

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Appendix

See Table 4.

Table 4 Descriptive statistics

		Mean	SD	Min.	Max.
Outcome					
IOI 2002	Level of incapacity	1.30	2.44	0	12
Well-being 2002	Level of well-being	0.82	1.15	0	5
Help					
Home help visits 1997	Number of visits a month	1.10	8.49	0	168
Home help visits 1997 × IOI 1997	Visits a month × level of incapacity	3.10	52.45	0	1680
Help from others 1997	=1 receives help from others	0.21		0	1
Need of home care 1997	=1 needs more home care	0.09		0	1

Table 4 continued

		Mean	SD	Min.	Max.
Initial health					
IOI 1997	Level of incapacity	0.74	1.61	0	12
Well-being 1997	Level of well-being	0.80	1.09	0	5
Nurse 1997	Level of frequency	0.06	0.35	0	3
Self assessed health good 1997	=1 good subject health	0.66		0	1
Self assessed health medium 1997	=1 medium subject health	0.26		0	1
Self assessed health poor 1997	=1 poor subject health	0.08		0	1
Raised blood pressure	=1 raised blood pressure	0.05		0	1
Diabetes	=1 diabetes	0.01		0	1
Asthma	=1 asthma	0.08		0	1
Osteoarthritis	=1 osteoarthritis	0.24		0	1
Myalgia	=1 myalgia	0.12		0	1
Osteoporosis	=1 osteoporosis	0.03		0	1
Back ailments	=1 back diseases	0.17		0	1
Depression	=1 depression	0.04		0	1
Contacts with GPs and specialists 1997	Number of contacts	13.76	18.34	0	186
Contacts with GPs and specialists 1992–1997	Number of contacts	67.87	67.84	0	767
Hospitalisation 1997	Number of hospital admissions	0.20	0.68	0	11
Hospitalisation 1992–1997	Hospital contacts 1992–1997	1.18	2.11	0	35
Days of hospitalisation 1997	Total days of hospitalisation	1.22	5.00	0	55
Days of hospitalisation 1992–1997	Days of hospitalisation 1992–1997	7.73	17.90	0	189
Social network					
Social network strong	=1 social network strong	0.56		0	1
Social network medium	=1 social network medium	0.34		0	1
Social network weak	=1 social network weak	0.10		0	1
Involuntarily alone 1997	=1 involuntarily alone often or now and then	0.17		0	1
Demographic and socio-economic					
Gender	=1 male	0.48		0	1
Age 67	=1 67 years	0.39		0	1
Age 72	=1 72 years	0.35		0	1
Age 77	=1 77 years	0.26		0	1
Basic general education	=1 basic general education	0.42		0	1
Upper secondary level/vocational	=1 upper secondary level or vocational	0.42		0	1
Short-cycle higher education	=1 short-cycle higher education	0.03		0	1
Medium-cycle higher education	=1 medium-cycle higher education	0.08		0	1
Long-cycle higher education	=1 long-cycle higher education	0.04		0	1
Blue-collar worker	=1 blue-collar job	0.29		0	1
White-collar worker	=1 white-collar job	0.40		0	1
Self-employed doctor, lawyer, etc.	=1 self-employed doctor, etc.	0.18		0	1
Self-employed agriculture, etc.	=1 self-employed agric, etc.	0.08		0	1
Income 1997	Level of income (DKK 10,000)	14.48	7.54	−11.28	112.65
Living alone	=1 living alone	0.35		0	1

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