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Are public care and services for older people targeted according to need? Applying the Behavioural Model on longitudinal data of a Swedish urban older population

Published online: 27 January 2006
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Abstract The objectives were to identify factors that predict the use of home help services and transition into institutional care and to study to what extent care services were targeted according to the individuals' needs. A further objective was to study whether people who had moved into institutional care facilities had received home help prior to institutionalisation. A community-dwelling sample ($n=502$) aged 81–100 was twice interviewed and assessed with medical examinations. Their use of public elderly care between 1994/1996 and 2000 was studied using survival analyses. *Need factors*, according to the Andersen Behavioural Model, were the most important predictors for the use of elderly care. Among people living alone, dementia, functional limitations, and depressive symptoms predicted the use of home help services and institutionalisation. Among non-demented cohabiting people, depressive symptoms and dependence in ADLs increased the likelihood of both home help and institutionalisation. Among cohabiting people with dementia, the effect of dementia was difficult to separate from the effects of ADL limitations and depression. *Enabling factors* were of importance among cohabiting people. A high level of education increased the likelihood of moving into institutional care, and informal extra-residential care increased the likelihood of both outcomes indicating that elderly care resources had not been targeted solely according to need. *Predis-*

posing factors such as age and gender were of importance only among people living alone. Basically the same factors predicted both the receipt of home help and institutionalisation. Only 4% of people living alone and 5% of those cohabiting moved to institutions without previously receiving home help.

Keywords Home- and community-based services · Elderly care · Dementia · Depression · The Andersen Behavioural Model

Introduction

An issue of vital importance in most welfare states is whether public resources for care and services for older people are targeted to the 'right' groups of care recipients. Countries operating different kinds of welfare state regimes tend to give different answers to this question because they allocate welfare production differently amongst the state, the market, and households (Esping-Andersen 1990, 1999). Consequently, the extent to which individuals and their families can count on publicly financed or provided care or are expected to care for themselves varies a great deal among different countries. A fundamental principle in the Scandinavian countries has been to provide publicly funded services based on individuals' needs, rather than restricting services to certain disadvantaged groups without family resources, or with limited means (Sipilä 1997). A comparative study in five countries (Norway, England, Germany, Spain, and Israel) showed that all these countries favoured a partnership between the family and the welfare state, even though the mix took different forms. Most Norwegians, belonging to the Scandinavian welfare state tradition, believed that the welfare state should be the prime source of care (Daatland and Herlofson 2003).

From an international perspective, Sweden has a well-developed system of care for older people.

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Cutbacks due to budgetary reductions were made during the 1990s and above all affected people with lesser need of help—younger elders and married people (Palme et al. 2003). In 1995, when the baseline data for this study was collected, 21% of the population aged 80 years and older received public home help services in ordinary homes and 21% lived permanently in institutions. About the same proportion in the corresponding age group received home help and institutional care in 2000 (National Board of Health and Welfare 1996, 2001). The home help service provides domestic services and personal care assistance in the home under the Swedish Social Services Act. Home help facilitates the day-to-day life of older people, thereby enabling them to stay in their own homes for as long as possible. This is in line with national goals stating that older people must be able to age in safety, retaining their independence (Swedish Government Bill 1997/98:113). Depending on the individual's needs, help with domestic chores (e.g. shopping, cleaning, cooking/meals on wheels, washing clothes), physical care (e.g. help getting up from bed, dressing, showering, toileting), or a combination of the two is provided. Assistive technology or home adaptation that is necessary for a functionally impaired person to manage daily activities is available without costs (Lilja et al. 2003). Home-based care such as home help or home nursing may be offered several times a day, if necessary also on weekends and at night, but when the care needs cannot be met in the older individual's own home, institutional care may be offered. Municipalities are responsible for providing and financing both home-based care and institutional care facilities. Users are charged a fee for home help, and most municipalities apply a system where the charge varies according to both the users' income and the scope of intervention. In the 1990s about 10% of home help recipients paid no fee at all, whereas persons with good income paid a fee that corresponded to the cost of buying services out-of-pocket. Institutional care was highly subsidised (user fees were estimated to cover about 3% of the total costs), even though the cost for individuals with good incomes could be considerable (Ministry of Health and Social Affairs 1999). Commercial alternatives for personal care assistance like bathing or dressing, paid out-of-pocket, or for institutional care without public funding are almost non-existent in Sweden.

This study followed a cohort of Swedish community-dwelling older people between 1995 and 2000 and their use of elderly care, if any. The Andersen Behavioural Model of Health Services Use was used as the analytic framework. The objectives were to identify factors that predict the use of home help services and transition into institutional care and to study to what extent care services were targeted according to the individuals' needs. A further objective was to study whether people who had moved into institutional care facilities had received home help services prior to institutionalisation, in line with Swedish policy goals to facilitate 'ageing-in-place'.

Predictors of elderly care utilisation: literature review

The Behavioural Model of Health Services Use set forth by Andersen and colleagues was originally developed to explain and predict health care utilisation (Andersen and Newman 1973; Andersen 1995), but has also been used for determining the use of social services (Calsyn and Winter 2000; Hawranik 2002; Penning 1995; Toseland et al. 2002). The model suggests that service utilisation can be explained by three generic blocks of variables: predisposing factors, enabling factors, and need factors. Predisposing factors such as age, gender, and social status reflect the propensity to use professional services should the need arise. Enabling factors include conditions that facilitate or inhibit the use of services such as family and community resources and accessibility to those resources. Need factors include individuals' functional capacity, symptoms, and general state of health.

Predisposing factors

Household composition is linked to older people's use of public care with the highest rates among older people living alone in Scandinavia (Daatland 1997), Germany (Linden et al. 1999), and the USA (Miller and Weissert 2000).

Studies of *gender* have yielded somewhat mixed findings, possibly due to the fact that women often outlive their spouses and thereby lack support from a cohabitee in old age. A previous study of this population (Larsson and Thorslund 2002) and national surveys of community residents in Sweden and the USA find no gender differences in receipt of formal services when controlling for health and functional status (Shea et al. 2003). A Dutch study shows higher risks of institutionalisation for women (Portrait et al. 2000). One US study reports higher risks of institutionalisation for men (Gaugler et al. 2003) whereas another finds no gender differences (Jette et al. 1995).

Enabling factors

Parental status may have an influence on the use of public care in several ways. On the one hand, parents are less likely to receive in-home support from formal helpers than childless people in both Sweden (Szebehely 1998) and the USA (Barrett and Lynch 1999). On the other hand, numerous studies have revealed that having relatives, particularly adult children, who may act as advocates in favour of their kin enhances the use of formal services in Scandinavia (Lingsom 1997; Thorslund 2003) and the USA (Langa et al. 2001). Parental status may also influence the risk of institutionalisation. Having an adult child caregiver reduces the likelihood of entering a nursing home in the USA (Pearlman and Crown 1992), although this seems to be true only for parents who have daughters (Freedman 1996).

Need factors

Physical ability is a consistent predictor of formal care utilisation. This is shown regarding the dependence in ADLs or IADLs (Activities/Instrumental Activities of Daily Living) in Canada (Crowell et al. 1996; Shapiro and Tate 1997), the USA (Liu et al. 2000; Miller and Weissert 2000), and Sweden (Thorslund et al. 1991). Finnish researchers report that difficulties in mobility outdoors are predictors of formal care use (Sakari-Rantala et al. 1995).

It is well known that *dementia* is associated with increased levels of dependence in activities of daily living. The degree to which dementia influences the use of in-home services seems to be dependent on whether a cohabiting caregiver is available (Gill et al. 1998), thereby highlighting the importance of taking household composition into consideration. Dementia or cognitive impairment is a leading predictor of institutionalisation in Sweden (Aguero-Torres et al. 2001) and Canada (St John et al. 2002), often in combination with behavioural problems (Gaugler et al. 2003; Yaffe et al. 2002) thereby increasing the burden on family caregivers (Dunkin and Anderson-Hanley 1998). A previous examination of the population in the current study showed that dementia increased the odds of receiving home help among people living alone. Among cohabiting people, dementia did not increase the odds of receiving home help, indicating that the demented person was cared for by the spouse without extra support from public elderly care. Only when the demented person also received informal care from outside the household, in most cases from adult children, did dementia increase the odds of receiving public care (Larsson et al. 2004).

In contrast to dementia, little attention has been paid to the impact of *depression* on the use of formal services. Dutch (Beekman et al. 1997) and Canadian (Hawranik 2002) studies find no difference in the use of home help between depressed and non-depressed individuals when controlling for functional limitations and cognitive impairment. Regarding institutionalisation, Miller and Weissert (2000) located nine studies that included depression, and in four of them, depression predicts institutionalisation. In the previous study of the population in this study, mentioned above, we showed interaction effects between depressive symptoms and education and household composition. Depressive symptoms decreased the odds of receiving home help among people with lower levels of education who lived alone. Depressive symptoms among highly educated people who lived alone and among cohabiting people of any educational level were not related to the receipt of home help (Larsson et al. 2004).

In summary, numerous studies have investigated predictors of in-home care or institutionalisation, particularly among demented people cared for by their relatives. Few studies have used longitudinal data and followed a community-dwelling population of the oldest old via a repeated assessment of need factors, as we

do in this study, and also taken into account changes in predisposing factors that occur during the follow-up period. This study complements previous research because the continuous information on the use of elderly care makes it possible to analyse the temporal relationship between in-home care and institutional care. It adds to previous research by applying the Andersen Behavioural Model on the use of elderly care in Sweden, as most studies using this theoretical framework come from countries with different welfare state traditions compared to the Scandinavian countries, above all from the USA.

Methods

Study population and design

The sample is based on a population-based longitudinal study undertaken in Stockholm, the Kungsholmen study. It included all individuals of age 75+ who were registered in the parish of Kungsholmen in the inner city of Stockholm in 1987. The initial interviews were carried out between 1987 and 1989, and 1,810 people participated in data collection (83% of eligible participants, after excluding participants who died between the selection of the study group and the start of the interviews). In the second wave of data collection, carried out between 1991 and 1993, 1,105 persons participated (61% of those previously interviewed). Of those who did not participate, 25% had died and 14% refused to participate. In the third wave of data collection, carried out between 1994 and 1996, 683 persons were interviewed (62% of participants interviewed in the previous round of data collection). Of those who did not participate, 34% had died and 4% refused to participate. In 1995, a comparison was made between participants in the third wave of data collection and the general population in Kungsholmen in the corresponding age group, regarding gender and marital status. The objective was to study whether attrition, because of mortality or refusals, had changed the composition of the study group in these respects. In the study group, 9% of the women were married and 66% widowed or divorced, compared to 10 and 65%, respectively, in the Kungsholmen population. Similarly, 54% of men in the study group were married and 39% widowed or divorced, compared to 52 and 40%, respectively, in the Kungsholmen population. The research design is reported in detail elsewhere (Fratiglioni et al. 1992, 1997).

The current study follows all participants in the third wave of data collection of the Kungsholmen study, aged 81+ living in ordinary dwellings, henceforth called 'baseline'. The risk of institutionalisation was examined for the whole study group (502 out of 520 individuals due to missing values in the independent variables), whereas the risk of subsequent use of home help was studied among people without home help at baseline (386 individuals). Information on use of home help services and institutionalisation was included in the

study until January 1, 2000. To capture changes in enabling and need factors that occurred during the study period, data from the fourth wave of data collection in the Kungsholmen study (1997–1998) and from now on called ‘the follow-up survey’ was included in the analyses as time-dependent covariates.

The Kungsholmen area did not differ much from the whole inner-city area of Stockholm regarding sex distribution and marital status. But compared to the rest of Sweden, women were overrepresented in the inner-city area or Stockholm. Further, compared to women in the rest of the country, urban women in this age cohort were twice as likely to have never married.

Each participant was interviewed by a nurse, and the information gathered during the interviews was both self-reported and based on the nurse’s evaluation. A physician conducted an extensive medical examination on each participant. A family interview was performed with the next-of-kin (a spouse/cohabitee, child, or sibling) and in some cases with a friend or neighbour. The information from the family interview was used to fill in gaps regarding informal care and use of private services if participants’ answers were incomplete and to cross-validate responses concerning care and service patterns of older participants.

Measures

Outcome variables

The outcome was the likelihood of (1) receiving home help services and (2) entering into institutional care during the follow-up period (between 1994–1996 and January 1, 2000). Information on the date of receipt of home help and entry into institutional care was obtained from the computerised registry of the Stockholm municipality, which maintains data on users of public care of older people. Institutional care facilities with round-the-clock services were regarded as institutions in this study.

Predisposing factors

Age The participants’ age at baseline (between 1994 and 1996).

Education Low level of education: elementary school or vocational training, between 2 and 7 years of education. High level of education: intermediate or higher education, 8 years or more.

Enabling factors

Household composition Participants were coded as cohabiting when they permanently shared a household with someone; all others were coded as living alone.

Children Having children (including adopted children or other children the participant had raised) or not.

Contact with friends Visiting or receiving visits ‘daily’, ‘several times per week’, or ‘once a week’ were coded as ‘often’. ‘Once a month’ or ‘have no friends’ were coded as ‘seldom/never’.

Informal care The participant and the informant were asked if the older person received help with practical chores or personal care at home from a relative or friend outside the household. Support from the cohabitee for those living with someone was not included. The answers were dichotomised into ‘receives’ and ‘receives no’ informal care.

Private services The participant and the informant were asked if the older person used practical support at home from private sources, paid out-of-pocket. The answers were dichotomised into ‘uses’ and ‘uses no’ private domestic services.

Need factors

Dementia Diagnoses were made according to the DSM-III-R criteria (APA 1987). The examining physician first made a preliminary diagnosis. Then, a specialist independently reviewed all cases and made a second preliminary diagnosis. In cases of agreement, this was the final diagnosis. In cases of disagreement, a third opinion was sought before the final diagnosis was accepted. The procedure for diagnosing dementia is described in detail elsewhere (von Strauss et al. 1999).

Depressive disorders Diagnostic criteria according to DSM-IV (APA 2000) were rated by the examining physician in accordance with the six-point CPRS Scale (Asberg et al. 1978). These criteria included depressed mood, diminished interest in activities, psychomotor disturbances, loss of energy, feelings of worthlessness, pessimistic thoughts, concentration difficulties, and suicidal thoughts. Lack of appetite and sleep problems were left out to minimise chances that depressive symptoms reflected physical rather than mental health. Data from the eight items were summed into a score ranging from 0 (no depressive symptoms) to 26 (maximum in this study group).

ADLs Functional ability was assessed using the Katz index of ADLs (Katz et al. 1963), which measures functional ability on a scale ranging from 0 (require no assistance) to 6 (require assistance in all activities).

Walking limitations Participants who could get around independently were coded as 0, and those using an assistive device such as a crutch, walking frame, or wheelchair were coded as 1.

IADLs The degree to which participants required assistance with cooking, shopping/meals on wheels, laundry (washing clothes), and house cleaning was rated from 0 (needs no help) to 4 (needs help with all activities).

Statistical methods

The likelihood of (1) receiving home help services and (2) entering into institutional care over the follow-up period was studied using survival analyses. The Cox proportional hazard models examine whether a particular event occurs and, if so, after how much time. Table 1 describes the study populations at baseline for the two events analysed. Table 2 describes the proportion of events and censored cases during the follow-up period.

The Cox regression model is well suited for analysing data from individuals who are in the study for different lengths of time and can include data on changes in independent variables that occur during the observation period. In this study we had updated information from the follow-up survey on enabling factors (household composition, frequency of contact with friends, receipt of informal care, and use of private services) and need factors (dependence in ADLs, in IADLs, and depressive symptoms) that may change over time. These variables were included in the analyses as time-dependent covariates. (Information about a participant who, for example, received no informal care at baseline but received informal care at the follow-up survey was coded 0 in the informal care variable for the time between baseline and follow-up interview and coded 1 for the time between follow-up interview and date of event or censoring.)

Analyses were run simultaneously for all individuals. Age, depressive symptoms, ADLs, and IADLs were given linear representation. Separate analyses were executed to test the assumption of linearity. In a previous study using cross-sectional data (Larsson et al. 2004) we found that different factors were correlated to the use of home help by people living alone compared to those cohabiting. Because of this, interaction terms between household composition (i.e. living alone vs. cohabiting) and all other independent variables were included in the models. This procedure gives exactly the same results as if two separate models were run. The results are presented separately, by household composition.

To study whether there were significant differences between predictors of home help and predictors of institutionalisation, the coefficients in the regression analyses were compared using *T* tests (Tables 3, 4).

To study how much each block of variables contributed to the explanatory strength of the total model, separate analyses were made in which one block of variables (i.e. predisposing/enabling/need factors) was removed at a time from the full model. Table 5 shows the reductions in model fit (absolute change in log likelihood, $-2LL$) between the full models shown in Tables 3 and 4 and the reduced models. *P* values take into account that the three blocks of variables contained different numbers of variables.

Results

Figure 1 illustrates the proportion of people receiving home help, residing in institutional settings or deceased, by household composition at baseline, during the 4.5 years of the follow-up period. The figure shows that the pattern of care utilisation depends on household composition. Twice the proportion of people living alone received home help at baseline, compared to those cohabiting.

A previous study of this population found interactions between dementia and other independent variables (Larsson et al. 2004). For this reason, we also tested interactions with dementia in this study. Among people living alone, no statistically significant interactions were found. Among cohabiting people, the analyses showed that depressive symptoms, dependence in ADLs, and informal care had different effects depending on the presence or absence of dementia. Interactions were thus included in the analyses of cohabiting people, but not of people living alone.

More or less the same factors that predicted the use of home help also predicted institutionalisation (Tables 3, 4). Use of home help services was therefore not included in the analyses of institutionalisation, as factors predicting institutionalisation were already captured in the home help variable. If home help had been included in the analyses of institutionalisation, it would have captured nearly all the effects of other independent variables, thereby camouflaging their genuine effects.

People living alone

Home help utilisation

Slightly more than half of the study group without home help at baseline (56%) became home help recipients during the follow-up period. Four per cent of people moved into institutional care without receiving home help (Table 2).

Predisposing factors Women were nearly twice as likely as men to receive home help. Ageing increased the likelihood of receiving home help by 7% per year whereas education was not significantly related to the use of home help.

Enabling factors No statistically significant results were found regarding parenthood, contacts with friends, receipt of informal care, or use of private services.

Need factors Dementia doubled the likelihood of receiving home help. Each additional depressive symptom increased the likelihood by 9%. Walking limitations requiring aids increased the likelihood by 52%, whereas dependence in ADLs or IADLs was not related to subsequent use of home help (Table 3).

Institutionalisation

One quarter of people living alone (26%) moved into institutional care during the follow-up period (Table 2).

Predisposing factors Each additional year of age increased the risk of institutionalisation by 9% whereas no statistically significant effect was found regarding gender or education (Table 3).

Enabling factors Frequent contacts with friends decreased the risk of institutionalisation by 36%. No statistically significant effect was found regarding

parenthood, receipt of informal support, or use of private domestic services.

Need factors Individuals diagnosed with dementia were six times more likely to move into institutional care. Needing help with IADLs increased the likelihood by 35% per household task, and depressive symptoms increased the likelihood of institutionalisation by 4% per symptom. Dependence in ADLs or walking limitations was not significantly related to later institutionalisation.

For each independent variable, we tested whether there were differences between the relative risk of

Table 1 Description of the study populations at baseline, by household composition at baseline, and Cox regression outcome variable (home help utilisation and institutionalisation)

Household composition	Lives alone		Cohabits	
	Outcome: home help, <i>n</i> = 275	Outcome: institutionalisation, <i>n</i> = 377	Outcome: home help, <i>n</i> = 111	Outcome: institutionalisation, <i>n</i> = 125
Public home help services				
Yes (%)	–	27	–	11
No (%)	–	73	–	89
Predisposing factors				
Age (in years)				
Mean	86.20	86.94	85.80	85.99
Min–Max	81–100	81–100	81–95	81–95
Interquartile range	4.00	5.00	5.00	5.00
Gender				
Female (%)	87	87	46	47
Male (%)	13	13	54	53
Education				
Low: 2–7 years (%)	55	54	43	44
High: 8 years or more (%)	45	46	57	56
Enabling factors				
Children				
Yes (%)	55	54	74	72
No (%)	45	46	26	28
Contact with friends				
Often: weekly or more often (%)	77	72	70	71
Seldom/never (%)	23	28	30	29
Informal extra-residential care				
Yes (%)	45	49	29	29
No (%)	55	51	71	71
Private domestic services				
Yes (%)	18	15	15	18
No (%)	82	85	85	82
Need factors				
Dementia diagnosis				
Yes (%)	6	14	10	14
No (%)	94	86	90	86
Depressive symptoms				
Mean	2.26	2.58	1.89	2.10
Min–Max	0–20	0–26	0–14	0–14
Interquartile range	3.00	4.00	2.00	3.00
Functional ability				
Dependence in ADLs				
Mean	0.12	0.29	0.31	0.41
Min–Max	0–2	0–6	0–4	0–6
Interquartile range	0.00	0.00	0.00	0.00
Walking limitations				
No limitations (%)	66	52	68	63
Needs aids (%)	34	48	32	37
Needs help with IADLs				
Mean	0.72	1.32	1.48	1.67
Min–Max	0–4	0–4	0–4	0–4
Interquartile range	1.00	2.00	3.00	3.00

Table 2 Proportion of events (home help utilisation and institutionalisation) and censored cases during the follow-up period, by household composition at baseline

Household composition	Lives alone		Cohabits	
	Outcome: home help ^a , n = 275 (%)	Outcome: institutionalisation, n = 377 (%)	Outcome: home help ^a , n = 111 (%)	Outcome: institutionalisation, n = 125 (%)
Events	56	26	38	19
Censored cases				
Deceased	10	25	20	27
Survived without event	30	49	37	54
Moved into institutional care	4	—	5	—
Total	100	100	100	100

^aPeople already receiving home help were excluded from the analyses

receiving home help and the relative risk of entry into an institution. The examination showed that dementia and need of help with IADLs were stronger predictors of institutionalisation than of home help use (Table 3).

For both outcomes, use of home help and institutionalisation, need factors had the highest explanatory value of the different blocks of variables included in the model (i.e. removing need factors from the full model reduced the absolute log likelihood the most). Predisposing factors also improved the explanatory value of the model for people living alone, whereas enabling factors did not contribute to the model fit (Table 5).

Cohabiting people

Home help utilisation

Over one-third of people without home help at baseline (38%) received home help during the follow-up period.

Five per cent of people moved into institutional care without first receiving home help (Table 2).

As mentioned earlier, the number of depressive symptoms, functional limitations in ADLs, and informal support from outside the household had different effects upon cohabiting people depending on the presence or absence of dementia. For each of these variables, separate effects for those with and without dementia were therefore calculated.

Predisposing factors No statistically significant effect was found regarding age, gender, or education (Table 4).

Enabling factors Having children and frequent contact with friends halved the probability of receiving home help. Use of private services was not related to the use of home help. Informal care from outside the household tripled the likelihood of receiving home help among people without dementia, whereas informal care was not significantly related to the chance of receiving home help among demented people.

Table 3 People living alone: likelihood of receiving home help services and of moving into institutional care

	Outcome: home help		Differences ^a in <i>P</i> value	Outcome: institutionalisation	
	RR	<i>P</i> value		RR	<i>P</i> value
Predisposing factors					
Age (in years)	1.07	0.006	NS	1.09	0.002
Gender (male = 0, female = 1)	1.91	0.030	NS	1.43	0.327
Education (low = 0, high = 1)	0.88	0.461	NS	1.02	0.935
Enabling factors					
Has children (no = 0, yes = 1)	0.80	0.183	NS	0.82	0.346
Contact with friends (seldom/never = 0, often = 1)	1.01	0.955	NS	0.64	0.053
Informal care (no = 0, yes = 1)	1.11	0.620	NS	0.92	0.717
Private domestic services (no = 0, yes = 1)	1.45	0.101	NS	0.73	0.394
Need factors					
Dependence in ADLs	1.15	0.520	NS	0.91	0.414
Walking limitations (needs no aids = 0, needs aids = 1)	1.52	0.024	NS	1.08	0.763
Needs help with IADLs	1.00	0.998	0.027	1.35	0.002
Dementia diagnosis (no = 0, yes = 1)	2.03	0.043	0.009	6.15	< 0.001
Depressive symptoms	1.09	< 0.001	NS	1.04	0.092

Results from Cox regressions

^a*P* values for the differences between RR of home help utilisation and RR of institutionalisation are presented for independent variables when *P* < 0.10

Need factors Walking limitation, or need of help with IADLs, was not related to later use of home help among cohabiting people. Among people *without dementia*, each ADL item with which an individual required assistance doubled the likelihood of receiving home help, and each depressive symptom increased the likelihood by 15%. Among people *with dementia*, dependence in ADLs or depressive symptoms were not significantly related to the chance of receiving home help. A higher degree of association was found between the number of limitations in ADLs and dementia and between the number of depressive symptoms and dementia (not shown). Among cases censored due to institutionalisation or death, there was also an overrepresentation of people with both a dementia diagnosis and several limitations in ADLs. Altogether, depressive symptoms and limitations in ADLs were not significantly related to the receipt of home help among demented individuals.

Institutionalisation

One-fifth of cohabiting people (19%) moved into institutional care during the follow-up period (Table 2).

Predisposing factors People with a high level of education had more than three times the risk of entry into institutions. No statistically significant effect was found regarding age or gender.

Enabling factors Having children reduced the risk of institutionalisation by 65%. Use of private domestic services or frequent contact with friends was not related

to the use of home help. Informal care from outside the household increased the likelihood of institutionalisation more than six times among people *without dementia*, whereas it was not related to subsequent institutionalisation among demented people.

Need factors Walking limitations more than doubled the risk of moving to institutional care, whereas IADL limitations were not related to later institutionalisation. Among people *without dementia*, each additional ADL activity with which a person needed assistance increased the likelihood of institutionalisation by 85% and each depressive symptom by 20%. Dementia diagnosis among people without depressive symptoms, ADL limitations, or support from informal sources increased the risk of institutionalisation more than ten times. Among *demented people*, depressive symptoms or ADL limitations were not significantly related to institutionalisation. People with dementia were more often censored in the analysis due to death.

Need factors had the highest explanatory value for both outcomes, use of home help and institutionalisation. Enabling factors also improved the model fit, whereas predisposing factors were of importance for institutionalisation among cohabiting people, but not for subsequent use of home help (Table 5).

Discussion

In the light of budgetary reductions and rationing of elderly care resources in Sweden in the 1990s, the

Table 4 Cohabiting people: likelihood of receiving home help services and of moving into institutional care

	Outcome: home help		Differences ^a in <i>P</i> value	Outcome: institutionalisation	
	RR	<i>P</i> value		RR	<i>P</i> value
Predisposing factors					
Age (in years)	1.03	0.621	NS	1.12	0.144
Gender (male=0, female=1)	0.69	0.301	NS	0.72	0.540
Education (low=0, high=1)	1.10	0.808	0.070	3.69	0.018
Enabling factors					
Has children (no=0, yes=1)	0.48	0.063	NS	0.35	0.078
Contact with friends (seldom/never=0, often=1)	0.52	0.074	NS	0.59	0.317
Informal care among those without dementia	3.06	0.007	NS	6.45	0.005
Informal care among those with dementia	0.17	0.341	NS	2.62	0.496
Private domestic services (no=0, yes=1)	1.77	0.245	NS	0.58	0.440
Need factors					
Dependence in ADLs among those without dementia	2.12	0.003	NS	1.85	0.002
Dependence in ADLs among those with dementia	1.45	0.329	NS	0.75	0.263
Walking limitations (needs no aids=0, needs aids=1)	1.66	0.219	NS	2.53	0.072
Needs help with IADLs	1.08	0.582	NS	1.29	0.199
Dementia diagnosis (no=0, yes=1)	3.86 ^b	0.122	NS	10.81 ^b	0.004
Depressive symptoms among those without dementia	1.15	0.016	NS	1.20	0.010
Depressive symptoms among those with dementia	1.09	0.512	NS	0.96	0.802

Results from Cox regressions

^a*P* values for the differences between RR of home help utilisation and RR of institutionalisation is presented for independent variables when *P* < 0.10

^bShows the effect of dementia among people with no depressive symptoms, no limitations in ADLs, and who receive no care from outside the household

Table 5 Reductions in explanatory strength after removing different blocks of variables from the full models in Tables 3 and 4

Block of variables	Lives alone (Table 3)		Cohabits (Table 4)	
	Outcome: home help	Outcome: institutionalisation	Outcome: home help	Outcome: institutionalisation
Predisposing factors	13.4**	11.1*	1.6	9.6*
Enabling factors	4.3	6.6	11.8*	12.1*
Need factors	22.1***	87.1***	25.3***	31.6***

Difference in absolute log likelihood ($-2LL$). P values from log likelihood ratio tests. * $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$

overarching research question was whether older people received elderly care based on their needs, in compliance with the Scandinavian welfare state tradition, or if other factors were of greater importance. The objectives of the study were to identify factors that predict subsequent use of home help services and transition into institutional care. The behavioural model provides an analytical tool for organising factors of importance for the use of care services.

The study showed that *need factors* were the most important predictors for use of elderly care. Among people living alone, dementia, depressive symptoms, and functional limitations (i.e. walking limitations or need of help with IADLs) predicted subsequent use of public elderly care. In that respect the Swedish welfare system targeted resources to the most needy, without taking the availability of informal care resources into account. Dementia was a significantly stronger predictor of institutional care than of receipt of home help services for people living alone. Dementia is a progressive degenerative disease and people suffering from dementia will sooner or later have difficulties managing at home, particularly those lacking the support of a cohabitee. It is likely that demented people living with a spouse suffered from more severe cognitive or functional limitations than people living alone before they received home help or moved into institutional care. This may explain why it was difficult to separate the effect of dementia from depressive symptoms and ADL limitations among cohabiting people.

Need of help with IADLs was significantly related to institutionalisation among people living alone, but not to receipt of home help. The reason for this is not clear, as studies of this sample of people using cross-sectional data at baseline showed that IADL limitations increased the odds of receiving home help considerably (Larsson and Silverstein 2004; Larsson and Thorslund 2002; Larsson et al. 2004). One explanation could be that budgetary reductions had raised the threshold for receiving home help. Merely needing help with household chores no longer seemed to be grounds for receiving home help. Those seniors in the sample who needed walking aids had a higher likelihood of receiving home help services.

Depressive symptoms predicted receipt of home help and institutionalisation, both for people living alone and those cohabiting. As this study used longitudinal data, we know that depressive symptoms preceded the care

utilisation. Whether better treatment of depression can prevent or postpone the use of public elderly care is not known; there is a need for further research in this area.

Enabling factors include conditions that facilitate or impede the use of services: in this study, social network, informal care from outside the household, and use of private services. Household composition is also an enabling factor according to Andersen's typology, but as we present separate results for people living alone and cohabiting people, this fact may be put out of focus. Figure 1 illustrates, however, that household composition is very important for the use of elderly care. A lower proportion of cohabiting people received home help at baseline, compared to people living alone, and a significantly smaller proportion of cohabiting people received home help during the follow-up period. Swedish studies have shown that cutbacks in elderly care spending have particularly affected married people, and that even very frail and old spouses (mostly women) have to care for their partners without support from home help services. The fact that informal care from outside the household increased the probability of receiving elderly care among cohabiting people indicates that not only needs-related factors, but also the availability of family members who can act as advocates might be important for receiving public care.

Predisposing factors such as increasing age and female gender were significantly related to the use of home help among people living alone. This mirrors the fact that people without the support of a cohabiting caregiver are the group most affected by the consequences of increasing frailty. Among cohabiting people, those with higher levels of education had a higher likelihood of moving into institutional care than people with lower levels of education. This is not in line with previous Swedish studies (Palme et al. 2003). We do not know whether highly educated people or their children were better at presenting their case for institutional care but we know that children may play an important part in deciding on entry into residential care. According to a recent Swedish study, almost all older parents who had moved to institutions reported that their children had encouraged them to move (Thorslund 2003).

A further objective was to study to what extent people who had moved into institutional care facilities had received home help services prior to institutionalisation. The study showed that basically the same factors that predicted receipt of home help services also

Fig. 1 Changes over time regarding proportion of people receiving home help, residing in institutional care facilities, or deceased, by household composition at baseline

predicted institutionalisation. Very few people moved into institutional care without previously having received home help services, thereby demonstrating that 'ageing-in-place' was a viable alternative for older people in Sweden. Because the municipalities provide and finance home help services and institutional care, there is an economic incentive to target public resources at people living in their own homes to postpone or prevent more expensive care in institutional care facilities. Our data, however, do not give any information about whether the older people themselves or their families felt that they had to move prematurely and could have managed with additional in-home support or if they had to wait too long before institutional care was offered.

Previous research shows that there is more than one route by which older people become recipients of elderly care. The initiation of in-home support is often through acute somatic care, sometimes followed by a short-term stay for rehabilitation in a nursing home. In the same

way, institutionalisation is often the result of a process during which frail elders move several times between hospital or respite care and home, before the final decision to move is made (Romøren 2003). The aim of this study was to identify predictors for the use of elderly care, i.e. for entering the care system for the first time, and it does not provide any comprehensive information about trajectories of care over a longer period of time.

The study has some limitations. It did not include information on hospital care, outpatient care, or home nursing, so we did not know whether acute diseases or accidents affecting participants or caregivers contributed to the need for elderly care. Neither was there any information available about the health and functional ability of the cohabitee. The spouse is frequently the only caregiver among married people, and both deterioration in the health or functional ability of the individual cared for and a decline in the health of the caregiver might result in a need for formal care. A fur-

ther limitation is that data on informal care were restricted to information about whether or not the participants received support from outside the household. Information was lacking about the frequency of contacts, which may have weakened the results regarding the importance of informal care.

By setting the age limit for the study group at 81 or older, we may have underestimated the strength of the analysed risk factors, as some people in the Kungsholmen study had already become home help recipients or entered institutional care. However, there is no reason to believe that including younger participants would have changed the results substantially because few younger seniors use public elderly care. Only 3% of the Swedish population aged 65–79 had moved to institutional care facilities when the baseline data were collected and 6% used home help services. The study uses data from the third wave of data collection of the Kungsholmen study. Even though there was attrition at each round of data collection, it did not influence the composition of the study group with regard to gender or marital status. In 1995, the study group was nearly identical in these respects to the total Kungsholmen population in the same age group.

Despite these limitations, the study has several strengths. First, the data were based on a longitudinal population-based study, thereby including people with functional or cognitive limitations not diagnosed by health care services or identified by personnel in the public elderly care organisation. The research group's assessments regarding dementia diagnosis or depressive symptoms were not communicated to the participants or others. It was therefore unlikely that participation in the study influenced care managers' decisions regarding home help or institutional care. Secondly, detailed data about functional ability and household composition were available from two waves of data collection, which allowed us to include changes in several enabling- or needs-related factors that occurred between baseline and follow-up. Thirdly, data on receipt of elderly care were based on register data from the city of Stockholm, which is also the basis for user fees. As the municipality has an interest in collecting fees and the seniors have an interest in paying only for services rendered, information from the register can be regarded as more valid. Fourthly, relatives were included in the data collection process which enabled us to cross-validate answers regarding informal care and use of private services. Interviews with next-of-kin were also used when diagnosing dementia. The longitudinal design of the Kungsholmen study allowed people who developed dementia and who had agreed to interviews with relatives at the initial interview (1987–1989) to remain in the study although they themselves could not fully contribute.

It is important to monitor the future development of service utilisation, both regarding in-home care and institutional care. Sweden currently has the oldest population in the world with 5% of its population aged 80 years and older. The majority of the 80+ population

are women who live alone in ordinary dwellings; many of them are dependent on the care from informal or formal sources to be able to remain in their own home for as long as possible. In future studies of service utilisation, more detailed data on type and frequency of informal care and more information about the informal caregivers themselves would improve the opportunity to study the interrelationship between formal and informal care. Questions about preferred and actual sources of care would also contribute to the understanding of the development of elderly care from the perspectives of the older people themselves.

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