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ORIGINAL INVESTIGATION

Care utilisation in the last years of life in Sweden: the effects of gender and marital status differ by type of care

Kristina Larsson · Ingemar Kåreholt · Mats Thorslund

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Abstract The effects of gender and marital status on care utilisation in the last years of life are highly correlated. This study analysed whether gender differences in use of eldercare (home help services or institutional care) or hospital care in the last 5 years of life, and the place of death, could be attributed to differences in marital status and thereby to potential access to informal care. A longitudinal Swedish study provided register data on 567 participants (aged 83 +) who died between 1995 and 2004. A higher proportion of unmarried than married people used home help services; this was true of both men and women. The likelihood of receiving home help was lower for those living with their spouse (OR = 0.38) and for those with children (OR = 0.60). In the 2 years preceding death, the proportion receiving home help services decreased and the proportion in institutional care increased. Women were significantly more likely to die in institutional care (OR = 1.88) than men. Although men were less likely to live in institutional care than women and more likely to be inpatients in the 3 months preceding death, after controlling for residence in institutional care, neither gender nor marital status was statistically significant when included in the same model. In summary, the determining factor for home help utilisation seemed to be access to informal care, whereas gender differences in health status could explain women's higher probability of dying in institutional care.

K. Larsson · I. Kåreholt (✉) · M. Thorslund
Aging Research Center, Karolinska Institutet and Stockholm University, Stockholm, Sweden
e-mail: ingemar.kareholt@ki.se

I. Kåreholt
Institute for Gerontology, School of Health Sciences, Jönköping University, Jönköping, Sweden

Introduction

Men and women meeting frailty in the last few years of life do so under different circumstances, regarding both the need for care and the type of care received. Women generally experience a longer period of dependency and frailty before death than men (Chan et al. 2011; Juel & Christensen 2008; Lunney et al. 2003) and therefore need care and services for a longer period at the end of life. Furthermore, sex differences in mortality mean that the probability of living without a spouse in the years preceding death is higher for women than for men (Tomassini et al. 2004). The fact that in many countries, women marry older men and have lower remarriage rates than men, further increases the risk that women will live without a spouse in old age (Arber and Ginn 2005; Bhrolcháin 2005; Statistics Sweden 2008). This means that when facing dependency, men have a higher probability of receiving care from a cohabiting caregiver than women, who more often must rely on care from outside the household, mainly from children, or on formal care services. Gender and marital status are thus closely intertwined and analyses of care utilisation in the last years of life should take this into account (Ernsth Bravell et al. 2009; Geerlings et al. 2005.

A previous analysis of the present study population of the oldest old in Sweden showed that care utilisation escalated in the last period of life. Nine out of ten older people received either eldercare (home help services or institutional care), hospital care, or both in the year preceding their death. However, the patterns of utilisation of the different kinds of care and services were not the same. The proportion in institutional care increased steadily over a 5-year period prior to death, with a sharper gradient 6 months before death. The percentage cared for in a hospital was low, 10–15 % per 3-month period, but

increased dramatically in the last 9 months of life. Use of public home help services, on the other hand, was relatively stable for the 5 years before death. The study showed that proximity to death was a more important determinant of institutionalisation and hospitalisation than increasing age. Use of home help, on the other hand, seemed to be determined by advanced age rather than time to death (Larsson et al. 2008).

The current study follows up this earlier study by examining the effects of gender and marital status on: (1) the use of eldercare and hospital care in the last 5 years of life and (2) the place of death. The main research question is whether there are gender differences in care utilisation and place of death after taking into account marital and parental status and thereby the possibility of receiving informal care.

From an international perspective, Sweden has an extensive system of care and services for older people. Municipalities are responsible for home-based eldercare and institutional care, and county councils are responsible for hospital and primary care. The majority of the cost is covered by local taxes; user fees cover only about 4 % of eldercare and 3 % of medical care costs (Swedish Association of Local Authorities and Regions 2009). Public eldercare is a needs-tested benefit, and a care manager is delegated by the municipal social welfare committee to make an assessment of each person's needs. People are assessed on an individual basis, and there are no explicit rules (for example based on the degree of dependency) that specify the amount of home help to which a person is entitled. Studies show that along with ADL limitations and dementia, living alone is one of the most important predictors of receiving home help services and of receiving institutional care (Larsson et al. 2004; Larsson et al. 2006). Home help services facilitate the daily life of older people, enabling them to stay in their own homes for as long as possible. 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, dressing, showering, toileting), or a combination of the two is provided. Home help may be offered several times a day, and if necessary, on the weekend and at night. Additionally, primary care staff provide nursing care in the homes to those who need specific medical procedures, and care workers are permitted to administer drugs under the supervision of a district nurse.

Although care of older people is an important focus of public policy in Sweden, numerous studies have shown that the bulk of support to community-dwelling older people in Sweden comes from informal sources (Davey et al. 2006; Wimo et al. 2011; Larsson 2006). The amount of informal care has been estimated as two to three times greater than the amount of formal care (Davey et al. 2006), and among those with substantial care needs, such as people with dementia, considerably more (Wimo et al. 2011). Care within the marital unit is difficult to measure and is most likely affected by a traditional division of domestic labour between men and women. Despite these challenges in measuring care, no gender differences have been shown regarding spousal care in Sweden, even after taking into account differences in age and care needs, either in a previous study of the Kungsholmen population (Larsson & Thorslund 2002) or in a nationally representative survey (Larsson 2006).

Analyses of transitions from independent living to institutional care in the Kungsholmen study group between 1987 and 2000 showed that married/cohabiting people were less likely to move to institutional care than those living alone, but the effect of having a partner was the same for men and women (Hallberg & Lagergren 2009). The traditional notion of women as the main providers of spousal care has been challenged in a British population-based study (Dahlberg et al. 2007) and in a US study, which found that men living at home were less likely to receive spousal care in the last year of life than women (Wachterman & Sommers 2006). However, the opposite was found in a Canadian study in which home-dwelling men were most likely to report a spouse as primary caregiver, and women were most likely to report children or children-in-law as primary care givers. In keeping with these findings, another US study (Noël-Miller 2010) and an Icelandic study (Sigurdardottir & Kåreholt 2014) showed that women were more likely than men to receive care from somebody other than the spouse.

In addition to gender and marital status, parental status influences the use of eldercare. Parents are less likely than childless people to receive support at home from formal helpers in Sweden (Johansson et al. 2003), Germany (Linden et al. 1999) and the United States (Barrett & Lynch 1999). On the other hand, numerous studies reveal that having relatives, particularly children, who may act as advocates enhances the use of formal services in Scandinavia (Lingsom 1997), the United States (Langa et al. 2001) and the Netherlands (Pot et al. 2009). A previous study of the present population showed that among cohabiting people, those with children had a reduced risk of institutionalisation, whereas among people living alone, needs-related factors such as dementia were the most important risk factors for institutionalisation (Larsson et al. 2006).

Numerous studies have shown that proximity to death, rather than chronological age, is the main determinant of health care utilisation and costs. The positive relationship between the use of health care and age is explained by the fact that as age increases, a higher proportion of people move into the final stage of life (Dixon et al. 2004; Forma

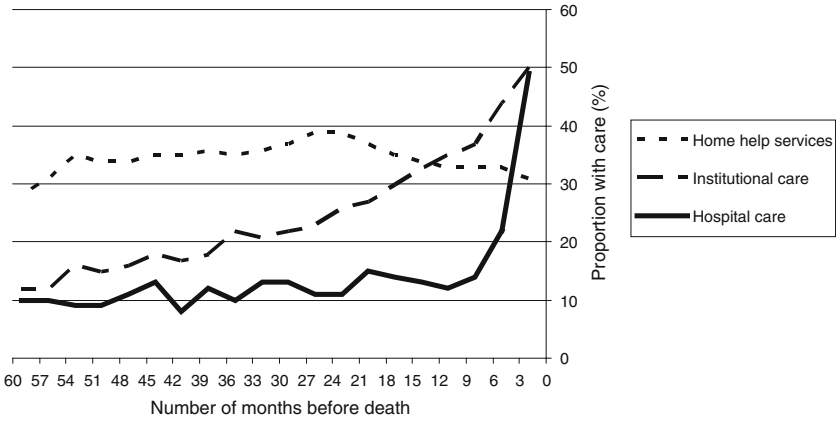

Fig. 1 Proportion using home help, residing in institutional care facilities or in hospital per 3-month period preceding death in the Kungsholmen Study population, Sweden, 1995–2004 (Larsson et al. 2008)

et al. 2007; 2009). Less is known about the factors that determine the utilisation of home help services and institutional care as, e.g., group dwellings for demented elderly persons and old age homes. Studies have found that the pattern of costs for this kind of long-term social and nursing eldercare is different from that of acute medical care. A Canadian study showed that the costs of nursing and social care rose with age, and additional costs for those close to death increased with age (McGrail et al. 2000). Several Finnish studies have shown that the number of days in institutional care increased regularly over the years before death, and the increase seemed to be both an effect of age and time to death. None of these studies, however, took into account the relative importance of gender and marital status on care utilisation in the last years of life.

The current study extends previous research by focusing attention on whether the gender differences in care utilisation in the last years of life can be attributed to differences in marital status and thereby potential access to informal care. Information on parental status and thereby the possibility of receiving support from informal sources outside the household has also been taken into account. This study also complements previous studies by employing longitudinal data on both eldercare and health care utilisation. These data span the 5-year period prior to death (See Fig. 1).

Materials and methods

Study sample

The data used in these analyses were derived from a longitudinal study in the inner city of Stockholm. The study sample consisted of all individuals aged 75 or older who were registered in the parish of Kungsholmen in 1987 and were living either at home or in an institution. A total of 1,810 individuals participated in the baseline data collection (83 % of eligible participants). The research design has been reported in detail elsewhere (Fratiglioni et al. 1992; 1997). We examined the utilisation of health care and eldercare services in the 5 years prior to death among the 567 individuals from the baseline sample who were still alive and participated in a follow-up survey conducted around 1995 (at which point they were aged 81 years or older) and who subsequently died between April 1995 and December 2004. Participants who died earlier were not included as no continuous data were available regarding eldercare prior to 1995. Care utilisation during the 3 months prior to death could be studied for all 567 individuals; however, corresponding 5-year analyses could only be undertaken for those 226 individuals who remained in the data collection process for 5 years or longer; i.e., who died between 2000 and 2004.

At the start of the study, the inner-city area chosen did not differ significantly from the remainder of Stockholm's inner-city areas as regards sex distribution and marital status. However, compared to the rest of Sweden, women were over-represented in Stockholm's inner city and were twice as likely as women in the rest of Sweden never to have been married.

Measures

Care utilisation was calculated from the exact date of death for each participant. For example, for a person who died on 10 March 2003, the number of days of eldercare or hospital care in the year preceding death was calculated from 11 March 2002, and corresponding 5-year data were calculated from 11 March 1998.

Outcome variables

Data on use of *home help services* and *institutional care* were obtained from the computerised register held by Stockholm Municipality. Institutional care with round-the-clock service included care in nursing homes, old people's homes, group accommodation for people with dementia

Table 1 Sample characteristics and use of eldercare and hospital care per time period preceding death

Marital status	Total	Men		Women	
		Married	Unmarried	Married	Unmarried
At death	$n = 567$	$n = 54$	$n = 75$	$n = 13$	$n = 425$
At the beginning of the study period	$n = 567$	$n = 61$	$n = 68$	$n = 32$	$n = 406$
Age at death, in years					
Mean	93	91	91	90	93
Median	93	91	91	91	93
Minimum to maximum	83–105	83–99	83–100	84–97	83–105
Home help by time before death[a]	%	%	%	%	%
0–0.25 year ($n = 567$)	31	24	36	8	31
0–1 year ($n = 507$)	42	30	44	17	43
0–5 years ($n = 226$)	73	37	78	50	77
Institutional care by time before death[a]					
0–0.25 year ($n = 567$)	50	37	48	61	52
0–1 year ($n = 507$)	54	43	51	67	56
0–5 years ($n = 226$)	68	58	74	83	68
Hospital care by time before death[b]					
0–0.25 year ($n = 567$)	49	67	60	46	45
0–1 year ($n = 507$)	60	81	71	67	55
0–5 years ($n = 226$)	86	95	83	83	86

The time periods prior to death are overlapping

[a] No overlap between home help services and institutional care for a specific day

[b] Hospital care may overlap home help services and institutional care

and short-term care. As the register only contained monthly statistics, any data on the use of eldercare were included as the actual number of days for that particular month. That is, we assumed that the onset of home help care and transfers *to* institutional care occurred at the beginning of each month, since this is the normal procedure. When a period of hospital care ended and home help or institutional care started the same month, we presumed that the home help/institutional care started immediately after (the day after) the end of the hospital care. Date of entry into and discharge from *hospital inpatient care* was obtained from the Swedish Hospital Discharge Register.

Control variables

Marital status

Married persons and those living in consensual unions when the last interview took place were coded as married. Widows/widowers and persons who were divorced or had never married were coded as unmarried.

Parental status

Have/have no children.

Education

2–7 years of education/8+ years of education.

Statistical methods

The figures are based on proportions without controlling for other variables. To partly even out random fluctuations in the curves, Figs. 2–4 were modified using a weighted moving average over five time periods. This was done by giving time period t − 1 (the time period before the present time period) and t + 1 half the weight of the 'middle' time period and giving periods t − 2 and t + 2 one-quarter of the weight. Thus, the end points of the curves in Figs. 2–4 do not correspond precisely with the percentages in Table 1.

The relative importance of gender and marital status for the likelihood of receiving home help, institutional care and hospital care prior to death was analysed using logistic regression analyses (Table 2). In Model 1, the outcomes were controlled for age; time to death; level of education; institutional care (except when it was the outcome); and either gender, marital status, or having children. In Model 2, all control variables, including gender, marital status, and having children, were included simultaneously in the regression analyses, thereby estimating the effect of each variable independently of the others. This means that the results for gender are as if men and women were equally often married and had the same proportion of children; as if married and unmarried people had the same gender distribution and had the same proportion of children; and as if those with and without children had the same gender distribution and equally often were married. No interaction terms have been included in the statistical models. This

means that in the models we assume, for example, that gender differences are the same for married and unmarried people.

In the regression analyses, each 3-month period was treated as a separate observation. This means that most persons contributed to more than one observation. If repeated measures from the same person were treated as independent, it could lead to erroneous low standard errors. To control for this possibility, we used the cluster-correlated robust estimate of variance (Huber 1967; White 1980; Williams 2000).

To analyse the effects of gender, marital status and parental status on the place of death, multinomial regressions were carried out. In these analyses, the odds of dying in institutional care and at home were compared to the odds of dying in a hospital. In initial analyses, the outcomes were controlled for age; time to death; level of education; and either gender, marital status, or having children. In a second model, all control variables were included simultaneously.

Changes in marital status during the follow-up time were taken into account both in Figs. 2–4 and in the regression analyses. The date of change in marital status was included as a time-varying covariate for those 26 individuals who were widowed during the follow-up period, e.g. if a person was widowed during the third 3-month period, that person was considered married for periods one and two and considered unmarried for period three and subsequent time periods. Those who were widowed during the study period were classified as unmarried at the end of life in Table 1.

Results

Most of the 567 participants were in their nineties when they died; ages at death ranged from 83 to 105 years. Over half the men (58 %) and almost all the women (97 %) were unmarried at the end of their lives (Table 1). This mirrors the composition of this urban sample, in which women who had never married were over-represented.

The greater part of the sample received public eldercare on some occasion in the 5 years preceding death; 73 % used home help services and 68 % experienced a period of institutional care. As regards hospital care, 86 % were admitted to a hospital at some point in the 5 years before death, whereas 14 % had no hospital stays at all during this time.

Home help services

Figure 1 shows that about one-third of the study population received home help services during each 3-month period, and the proportion was relatively stable for the 5 years before death. There was a tendency towards an upwards trend until 2 years before death; this upward trend was followed by a slight downturn.

After splitting the same data by gender and marital status (Fig. 2), a more complex picture appeared. A higher proportion of unmarried than married people received home help services. Among those who were unmarried, a higher proportion of women than men used home help services, and in the 5 years prior to death, the proportion of women who used home help services was double that of

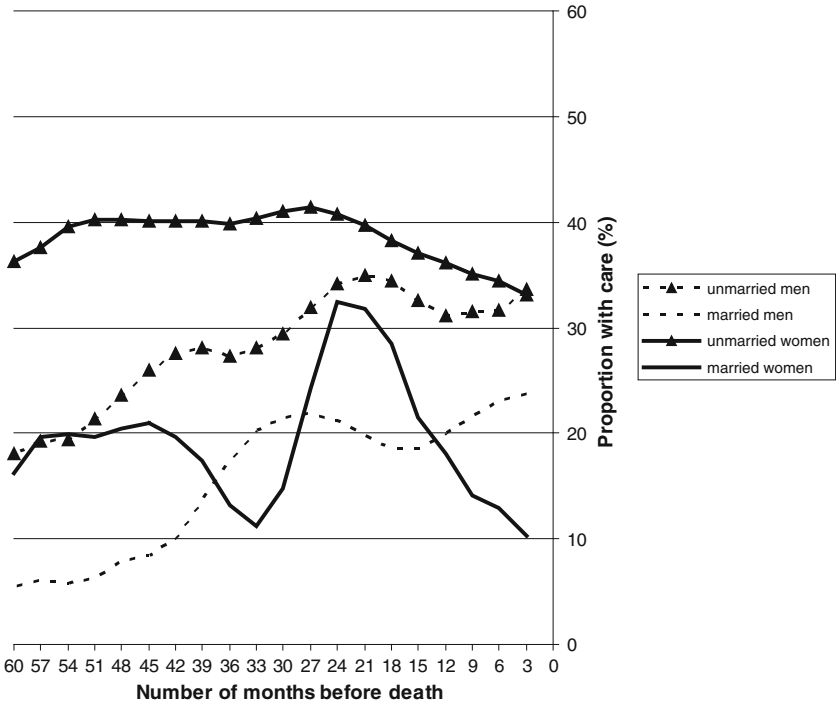

Fig. 2 Proportion using home help services by gender and marital status per 3-month period preceding death in the Kungsholmen Study population, Sweden, 1995–2004. The curves are modified using weighted moving averages over five time periods

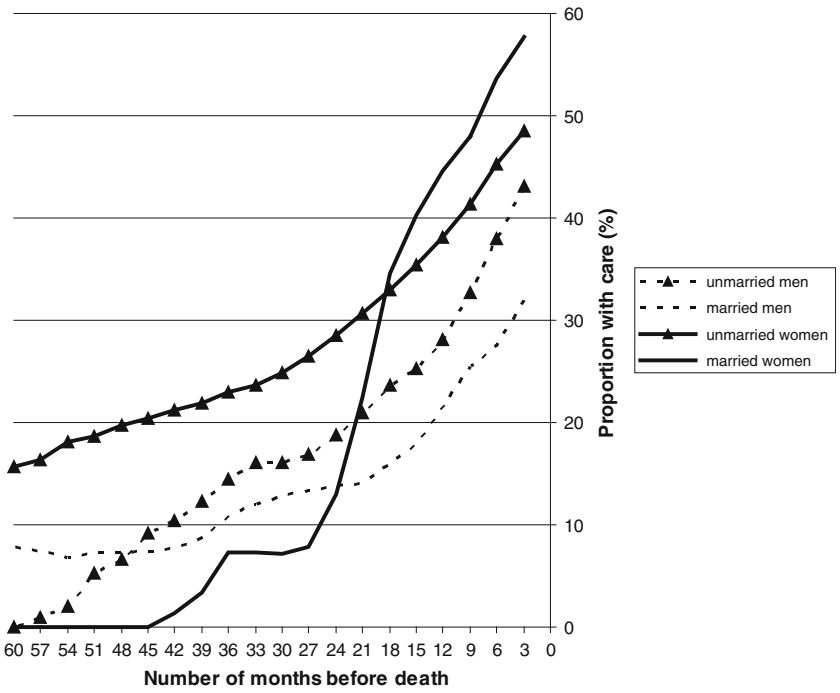

Fig. 3 Proportion in institutional care by gender and marital status per 3-month period preceding death in the Kungsholmen Study population, Sweden, 1995–2004. The curves are modified using weighted moving averages over five time periods

men. The gender difference in care utilisation disappeared towards the end of life, and about one-third of both unmarried men and women received home help services in the last 3-month period.

Among married people, the use of home help increased gradually, and a quarter of the men received home help in the last 3 months of their lives. The corresponding curve for women fluctuated because of the small number of women still married (see Table 1) but showed a sharp downturn about 2 years prior to death.

Institutional care

As shown in Fig. 1, the proportion of people in the study group who resided in institutional care increased steadily, with a marked increase 6 months prior to death. During the last 3 months, half the population received institutional care at some point. Breaking down the information by gender and marital status (Fig. 3) revealed an increase for both married and unmarried people and for men and women. The highest proportion of individuals in institutional care was found among unmarried women until 18 months preceding death, when the proportion of married women in institutional care exceeded that of unmarried women.

Hospital care

Over the whole study period, about 10–15 % of the study group were admitted to a hospital. A marked increase in hospital admissions was seen during the last 9 months of life, when the proportion cared for in a hospital soared. In the 3 months prior to death, half of the study group were admitted to a hospital for at least 1 day (Fig. 1).

There was little variation between married and unmarried individuals 1–5 years before death, with the exception of married women. Among married women, the proportion admitted to hospital increased 2–3 years before death. In the 3 months before death, a higher proportion of men (both married and unmarried) than women (both married and unmarried)] were cared for in a hospital (Fig. 4 and Table 1).

Multivariate analyses of patterns of care utilisation

To distinguish between the effects of gender, marital status, and parental status, logistic regression equations were performed using the three type of care received as the dependent variables (Table 2). The proportion using home help services did not change much during the 5 years before death, and the proportion in institutional care increased gradually (Fig. 1). Predictors of care utilisation were thus calculated for the whole follow-up period of 5 years. Hospital care, in contrast, increased considerably in the last year and peaked in the months preceding death (Fig. 1). Separate equations were therefore performed for the last 3 months, the whole last year, and the time before the last year (>1–5 years).

Gender was significantly correlated with the use of home help, institutional care and hospital care. In the 3 months prior to death, men were less likely than women

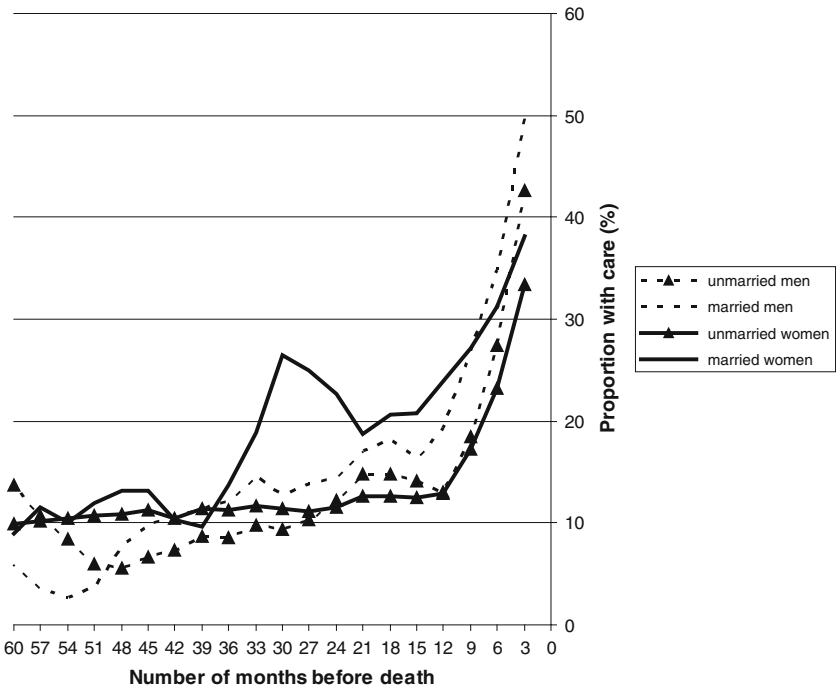

Fig. 4 Proportion in a hospital by gender and marital status per 3-month period preceding death in the Kungsholmen Study population, Sweden, 1995–2004. The curves are modified using weighted moving averages over five time periods

Table 2 The relative importance of gender, marital status and parental status for the likelihood of receiving home help services, institutional care and hospital care the 5 years preceding death

	Home help services		Institutional care		Hospital care >1–5 years		Hospital care 0–1 year[d]		Hospital care 0–0.25 year[d]	
	OR	*P* value	OR	*P* value	OR	*P* value	OR	*P* value[2]	OR	*P* value
Gender (ref = women)										
Model 1[a]	**0.53**	**0.010**	**0.56**	**0.022**	0.99	ns	1.17	ns	**1.70**	**0.020**
Model 2	0.84	ns	0.66	ns	0.91	ns	1.02	ns	1.49	ns
Marital status (ref = unmarried)										
Model 1[b]	**0.30**	**<0.001**	**0.49**	**0.025**	1.18	ns	1.41	ns	1.62	ns
Model 2	**0.38**	**0.008**	0.59	ns	1.25	ns	1.38	ns	1.18	ns
Children (ref = no children)										
Model 1[c]	**0.52**	**0.001**	0.94	ns	0.97	ns	1.11	ns	**1.45**	**0.047**
Model 2	**0.60**	**0.014**	1.08	ns	0.95	ns	1.06	ns	1.33	ns

ns, $p \geq 0.05$. Results with $p < 0.05$ are in bold.

Note: All models were controlled for age, time to death, level of education, institutional care (except when it was the outcome). In Model 1 either gender (a), marital status (b), or having children (c) was included. In Model 2 all variables were included simultaneously. (d) Overlapping time periods

to receive home help (OR = 0.53) and to be institutionalised (OR = 0.56) but more likely to be admitted to a hospital (OR = 1.70). When we also controlled for marital and parental status, no statistically significant gender effects were detected. Gender and marital status were highly correlated (Spearman's $\rho = 0.48$), and it was difficult to disentangle the separate effects of these two variables.

Marital status was significantly correlated with eldercare, home help and institutionalisation, but not with hospital care. Married people were less likely than unmarried people to receive home help services (OR = 0.30) and to reside in institutional care (OR = 0.49). After controlling for gender and parental status, the effect remained significant for home help (OR = 0.38) but not for institutionalisation.

Having children reduced the likelihood of receiving home help services (OR = 0.52); this result remained statistically significant after controlling for gender and marital status (OR = 0.60). Parental status was also important for

Table 3 Place of death by gender and marital status (%)

	Total	Men		Women	
	$n = 567$	Married $n = 54$	Unmarried $n = 75$	Married $n = 13$	Unmarried $n = 425$
Private home, no home help services	15	15	12	8	15
Private home, used home help services	12	9	16	7	12
Institutional care	44	33	36	54	47
Hospital	29	43	36	31	26
	100	100	100	100	100

hospital care. Having children increased the probability of staying in a hospital during the last 3-month period of life (OR = 1.45). However, controlling for gender and marital status, the association between having children and staying in a hospital during the last 3 months of life was not statistically significant.

Place of death

Half the study group lived in institutional care at some point during the 3-month period leading up to their death (Table 1), and most of them also died there (Table 3). Almost half of the women and one-third of the men in the study group died in institutional care. Twenty-nine per cent of the sample died in a hospital, the highest proportion among married men (43 %) and the lowest among unmarried women (26 %). The remaining 27 % died at home; 12 % of these people were recipients of home help services, and 15 % were not. The proportion of those who died without eldercare and outside a hospital was the same for married and unmarried individuals.

Multinomial regressions were used to separate the effects of gender, marital status and parental status on the place of death (not shown). These analyses, which used hospital care as the reference category, revealed that married people had half the odds (OR = 0.58, $P = 0.074$) and women twice the odds (OR = 1.99, $P = 0.005$) of dying in institutional care, whereas having children did not influence the probability of dying in institutional care. When all the variables were included in the regression, women still had almost two times the odds (OR = 1.88, $P = 0.026$) of dying in institutional care as men, after controlling for marital status, parental status, age, time to death and level of education. (The results from the multinomial logistic regressions are available from the authors.)

Discussion

The objective of this study was to distinguish between the effects of gender and marital status on different kinds of care utilisation in the last 5 years of life. Analyses regarding home help services showed that a higher proportion of unmarried than married people received help, and among the unmarried, a higher proportion of women. But the regression analyses revealed that gender did not have a significant impact on home help utilisation after controlling for marital status. The important factor seemed to be access to informal care. Living with a spouse decreased the odds of receiving home help in the last 5 years of life by 62 %, and having children decreased the odds by 40 % after controlling for gender. Results showing that marital status influences end-of-life care similarly for men and women have been found in another Swedish study (Ernsth Bravell et al. 2009), as well as in the Netherlands (Klinkenberg et al. 2005) and in the United States (Wachterman & Sommers 2006).

In the 2 years preceding death, the proportion receiving home help services decreased and the proportion in institutional care increased. This finding probably reflects the transition from home-based to institutional care. In the 3-month period immediately prior to death, almost one-third of the study group received home help services, and half lived in institutional care with round-the-clock service. The graphs for institutional care showed that a higher proportion of unmarried than married men lived in institutional care and that until 18 months prior to death, a higher proportion of unmarried than married women lived in institutional care. Even though the odds that men would reside in institutional care were half those of women, and the odds that married people would reside in institutional care were half those of unmarried people, neither gender nor marital status were statistically significant predictors of institutionalisation when included in the same model. This finding, as well as the changing difference between unmarried and married women, might be due to the relatively small sample size. Results from the United States show that the probability of institutionalisation in the last 2 years of life (Weaver et al. 2009) or in the last year (Wachterman & Sommers 2006) was lower when informal support from a spouse was available. Furthermore, a Swedish study confirms the result that marital status generally influences end-of-life care similarly for men and women (Ernsth Bravell et al. 2009). It was the presence or

absence of a spouse at the end of life that accounted for most of the gender disparities.

As regards hospital care, men were more likely than women to be admitted as an inpatient in the 3 months preceding death. This might reflect gender differences in health status, as older women are more likely than men to have conditions that are non-fatal but result in functional problems, such as problems with mobility or ADL and IADL limitations, and men are often considered more vulnerable to life-threatening conditions (Chan et al. 2011; Juel & Christensen 2008; Oksuzyan et al. 2008; Romøren 2003). This means that women more often live in institutional care at the end of their lives and receive medical treatment there, whereas men more often live at home and are admitted to a hospital when taken ill. However, when marital status was taken into account, the gender difference was no longer statistically significant.

An increasing number of studies on health care utilisation in the final years of life are taking marital status into account and thereby can consider the potential of informal care. A study from the United States on health care use in general showed that married people aged 65 and over used higher quality hospitals and had shorter lengths of stay than those who were widowed. It seemed that married people were better informed and were able to make better choices about which hospital to use, a finding that emphasises the role of spouses as advocates for their partners (Iwashyna & Christakis 2003). Similar results have been reported from Sweden, where informal care was associated with utilisation of outpatient care (Condelius et al. 2010), and from the Netherlands, where researchers found that older people with a partner were more likely to have contact with medical specialists than those without a partner (Pot et al. 2009). This Dutch study also showed that having children increased the probability of being admitted to a hospital in the 3-month period before death. This might indicate that children influenced health care utilisation. However, this result was no longer statistically significant after controlling for gender and marital status.

In line with previous Swedish research (Jakobsson et al. 2006), the current study showed that most people who lived in institutional care also died there. Women had two times the odds of dying in institutional care as men after controlling for marital status. This might be because women more often have long-standing illnesses and therefore are more likely to move to institutional care, whereas men more often have acute diseases and are more often treated in a hospital. Without examining each patient's medical history, it is impossible to determine whether too many or too few people were treated in a hospital in the last period of life. Recent Swedish research has questioned whether the lower utilisation of medical healthcare among people living in institutional care is a consequence of better supervision of medical conditions or a sign that staff in institutional care are acting as 'gatekeepers' for hospital care (Condelius et al. 2010). However, it is well known that transitions between care facilities may have a negative impact on older people's well-being (Mezey et al. 2002) and that hospital admission of nursing home residents can be detrimental to their health (Caplan et al. 2006).

It is essential to keep in mind that people of advanced age may also live independently to the very end of their lives. Fifteen per cent of the study group died outside a hospital, outside institutional care and without any public home help services. This proportion was equally large for married and unmarried people.

Although the number of married women was small and decreased even more during the follow-up period, their pattern of care utilisation demands attention. Two years before death, they were referred to a hospital more often than unmarried women. Later, the proportion living in institutional care peaked and the proportion receiving home help decreased correspondingly. These data indicate that a high proportion of married women could not be cared for at home in the last 2 years of life, possibly because of the health status of even older and more disabled husbands. The multivariate analyses showed that both gender and marital status were significantly associated with institutionalisation. The small sample of married women and the high correlation between gender and marital status in the analyses made it difficult to sort out the independent effects of these predictors.

Several limitations must be acknowledged at this point. Firstly, the study population was recruited from an urban area, and unmarried women (a group for which cohabiting caregivers were absent) were over-represented in the sample. The group of unmarried women consisted of women who previously had been married or had never been married. However, we do not expect that there is a difference between these two categories of unmarried women after controlling for the presence of children. The proportions of people in the sample who used home help services and resided in institutional care were similar to the proportions in the nation as a whole. However, the number of women who were still married when they died was small, which limited the ability to detect gender differences among married individuals, partly because of lack of statistical power. A small proportion of women still married was expected since only 18 per cent of the women aged 80+ where married in the Swedish population of 2000 (Statistics Sweden 2002).

Secondly, data on home help services were restricted to information regarding whether or not the participants used municipal home help services. We lacked data on the number of hours of help received per month and the frequency of visits. Thus, it was not possible to study gender

differences in the intensity of home help in relation to remaining length of life. The register data on home help and institutional care were monthly and therefore somewhat lacking in precision. We have assumed that the onset of home help and transfers *to* institutional care occurred at the beginning of each month, since this is the most common procedure. When a period of hospital care ended and home help or institutional care started the same month, we presumed that the home help/institutional care started immediately after the end of the hospital care. No information was available on either home-based health care interventions provided by the county council's primary care team or potential gender differences in outpatient health care utilisation.

Thirdly, we had no information about the health and functional ability of the spouse or the distance to children. Therefore, being married and having children must be seen as an indicator of potential access to informal care rather than as information on the actual care given.

Despite these limitations, this study has several strengths. Firstly, information on inpatient care and eldercare utilisation came from official registers. The Swedish Hospital Discharge Register uses the Swedish personal identification number, which makes it possible to follow a patient both between different hospitals and over time. Information on the use of home help services and residence in institutional care came from register data from the Municipality of Stockholm. These data may be deemed reliable since the register provides the basis for user fees. The municipality has an interest in collecting these fees, and older people have an interest in ensuring the date on services are correct so that they only pay for the services actually rendered. Both registers use the same personal identification number, facilitating the matching of the different kinds of care utilisation to the individual. As information from hospital and public eldercare records is classified, it is only possible to access and analyse this information when participants have given their consent, which all persons included in the study did. Secondly, the data came from a longitudinal population-based study; baseline interviews for this study were conducted between 1987 and 1989. The design of the Kungsholmen study allowed people who went on to develop dementia or other longstanding illnesses to remain in the study if they had agreed at baseline to allow relatives to be interviewed on their behalf. The possibility of using such proxy interviews reduced the dropout rate, particularly among people with extensive care needs.

In conclusion, the effects of gender and marital status on care utilisation in the last years of life differ depending on the type of care studied. Regarding home help services, the important factor seemed to be access to informal care, as both cohabitation with a spouse and having children reduced the odds of receiving public eldercare at home. However, when care needs became so substantial that round-the-clock nursing or hospital care was required, neither having a spouse nor having children influenced care utilisation. Regarding the place of death, there appeared to be a clear gender pattern in which women's longer periods of living with disease and functional impairments at the end of life meant that they had almost twice the odds of dying in institutional care as men.

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