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Planned and Unplanned Hospital Admissions and Their Relationship with Social Factors: Findings from a National, Prospective Study of People Aged 76 Years or Older

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Objective. To examine the relationship between social factors and planned and unplanned hospital admissions among older people.

Data Sources/Study Setting. 2011 data from the Swedish Panel Study of Living Conditions of the Oldest Old (SWEOLD) and data from the Swedish National Patient Register until December 31, 2012.

Study Design. The study had a prospective design. Data were analyzed via Cox proportional hazard regressions with variables entered as blocks (social factors, sociodemographic and ability factors, health factors).

Data Collection. Data were collected via interviews with people aged 76+ ($n = 931$).

Principal Findings. Living in institutions was negatively associated with planned admissions (hazard ratio (HR): 0.29; confidence interval (CI): 0.09–0.88), while being in receipt of home help was positively associated with unplanned admissions (HR: 1.57; CI: 1.15–2.14). Low levels of social contacts and social activity predicted unplanned admissions in bivariate analyses only. Higher ability to deal with public authorities was positively associated with planned admissions (HR: 1.77; CI: 1.13–2.78) and negatively associated with unplanned admissions, although the latter association was only significant in the bivariate analysis.

Conclusions. Hospital admissions are not only due to health problems but are also influenced by the social care situation and by the ability to deal with public authorities.

Key Words. Older adults, risk factor, hospitalization, home help, competence

People aged 65 years or older constitute approximately 60 percent of hospital admissions in Sweden (National Board of Health and Welfare 2017). Hospital admissions are not only determined by a person's objective and subjective care needs. Several other factors may influence the use of health care services, especially among older people (Hallgren et al. 2016), and there are health care visits without clear medical basis, where older people seem to be accessing care for social reasons (Samaras et al. 2010; Hallgren et al. 2016). Thus, the inclusion of social factors in research would offer a broader understanding of health care use. Still, research has been dominated by studies that consider health-related factors while social factors have often been overlooked (McCusker et al. 2003; Wallace et al. 2014). It can be argued that if access to health care is obstructed by factors that are not health related, the system is not serving all people in need equally (Walter-Ginzburg et al. 2001). Based on a national prospective study from Sweden, this study presents findings on planned and unplanned hospital admissions and their relationship with social factors among older people.

Sweden has a universal, comprehensive, and mainly tax-financed health care system in which services should be accessed based on need, regardless of economic or social resources, although studies have shown that this objective has not been fully reached (e.g., Agerholm et al. 2015). Copayments exist, but are small (≈4 percent), and those with extensive health care needs are covered by a national high-cost protection (ceiling set at SEK 1,100, after that no further charges for the remainder of the 12-month period). In international comparisons, Swedish health care usually performs well with regard to costs, access, and health outcomes, in relation to the needs of the population (Swedish Association of Local Authorities and Regions 2016).

As in many other European countries, the health care system in Sweden has undergone substantial changes in recent decades, with a reduction in the number of hospital beds (Sweden now has the lowest number of hospital beds per capita in Europe), shorter hospital stays, and an increase in treatments in

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outpatient care (National Board of Health and Welfare 2015; OECD 2016). There have also been substantial cutbacks in municipal institutional care of older people in Sweden and many other European countries (OECD 2016). This means that there is now a higher threshold so that only the most frail older people can access institutional care (Schön, Lagergren, and Kåreholt 2016), with the consequence that many frail older people are dependent on care in their own homes, both formal care such as home help and home health care, and informal care provided by families and relatives. However, the cutbacks in institutional care have not been fully compensated for by an increase in home help services (National Board for Health and Welfare 2016). As a consequence, a larger proportion of frail older people have to cope with less or no formal support, which places more responsibility on the individual, and assumes that the individual has sufficient capacity to take care of his/her health and to navigate the health care system. In this respect, relatives and the wider social network can have a significant role in supporting the older person in self-care and contacts with public authorities.

Previous research on health care use has more often examined medical and health-based factors rather than social factors, and research covering social factors tends to only include one or a few such factors (McCusker et al. 2003; Wallace et al. 2014), sometimes discussed in terms of enabling factors (Andersen 1995). When reviewing the research, it is important to consider cross-country differences in health and social care systems. Below, we therefore explicitly state when a study concerns the Swedish context, as such studies can be anticipated to be of higher relevance for our study.

There is conflicting evidence on the impact of social factors on health care use among older people. For example, it has been shown that living alone (Landi et al. 2004; Mu, Kecmanovic, and Hall 2015) and being widowed (Dolja-Gore et al. 2017) are risk factors for hospital admission, while other studies have found no associations between living alone and hospital admissions (Fernandez-Olano et al. 2006; Ennis et al. 2014; Ilinca and Calciolari 2015). Furthermore, studies have reported that hospital admissions are not predicted by social activity (Ilinca and Calciolari 2015) or social support (Fernandez-Olano et al. 2006), while there is some evidence for an association between loneliness and hospital admissions (Nägga et al. 2012). Health care utilization can also be influenced by the social care situation. For example, there is evidence that living in an institution reduces hospital care (Forder 2009).

Health care and hospital admissions can be planned or unplanned. In Sweden, planned hospital care is most often accessed via referral from primary

care and includes, for example, elective surgeries. Planned care use is intentional and can be preventative and can thus be seen as a sign of effective self-management of health (Molloy et al. 2010). Unplanned health care can, on the other hand, be caused by inability to take care of oneself or breakdown of the care situation at home (Samaras et al. 2010; Gruneir, Silver, and Rochon 2011). In addition to different behavioral mechanisms behind planned and unplanned health care, unplanned care can also be an indication of dysfunctions in other parts of the care system, such as primary care (Stiernstedt 2016). It is therefore important to make a distinction between planned and unplanned care in analyses of risk factors of care use. Research would therefore also benefit from taking people's levels of everyday mental capacity into consideration.

Still, research on the impact of social factors on hospital admissions rarely distinguishes between planned and unplanned admissions. Starting with planned hospital admissions, research has found that loneliness was not significantly associated with the use of planned hospital care (Molloy et al. 2010). This has been confirmed in more recent research in Sweden (Taube et al. 2015). Regarding unplanned hospital admissions, the risk for such admission is higher for unmarried people (Inouye et al. 2008), and a recent Swedish study found higher odds of admission in older people living alone (Pimouguet et al. 2017). Social network and social isolation have been found to have no significant association with hospital admissions following emergency department visits (Naughton et al. 2011), whereas an association between loneliness and unplanned hospital admissions has been reported (Rönneikkö et al. 2017). Finally, it has been shown that the rate of unplanned hospital admissions decreases after moving to nursing homes (Atramont et al. 2017).

There is more research on social factors in relation to unplanned health care with focus on emergency department visits, which may or may not lead to hospital admissions. In this context, findings on marital status and cohabitation are conflicting (cf. McCusker et al. 2003). While some research has reported that marital status and cohabitation are not associated with emergency department visits (Fan et al. 2011), other research has found an association between living alone and emergency department visits (Hastings et al. 2008). There is also a higher prevalence of vulnerable social network types—such as networks dependent on family or with lack of community contacts—among older patients in emergency departments than among older people in general (Fealy et al. 2012; cf. McCusker et al. 2003; Naughton et al. 2010). Similarly, a study examining acute care at emergency departments and

general practitioners found higher odds for such visits among older people who did not have regular contacts with their friends or family (Jordan et al. 2008). Research has also identified an association between emergency department visits and loneliness (Molloy et al. 2010), but no association has been found with social support (Hastings et al. 2008).

A limitation of previous research is that studies have more often been based on clinical rather than community or national samples of older people and on self-reported care use rather than hospital records or registry data (see Newall, McArthur, and Menec 2015). Many studies have a cross-sectional rather than longitudinal design. This means that there is a lack of studies based on reliable data for the general population of older people. There is also a general lack of research making a distinction between planned and unplanned hospital admissions, despite the different rationale behind such care use.

Based on a nationally representative survey in combination with care registry data, the aim of this study was to examine planned and unplanned hospital admissions and their relationship with social factors among older people, with focus on both social interaction and the social care situation. Hospital admissions constitute what is sometimes discussed in terms of hospitalization or inpatient care.

METHODS

Sample and Procedures

This study has a prospective design and is based on the Swedish Panel Study of Living Conditions of the Oldest Old (SWEOLD; Lennartsson et al. 2014). SWEOLD started in 1992, and this study draws on the 2011 data collection wave with 931 respondents aged 76 years or older, including representative oversampling of people aged 85–99 years (total response rate: 86.2 percent). Face-to-face interviews were carried out as the main interview mode, with postal questionnaires used if the respondent did not agree to an ordinary interview or was unable to conduct an ordinary interview due to, for example, hearing problems, and proxy interviews for people unable to be interviewed directly. The high response rate, the inclusion of institutionalized persons, and the use of proxy informants ensure that the SWEOLD sample is representative of older people in Sweden. Informed verbal consent was obtained prior to each interview.

SWEOLD data were combined with data from the Swedish National Patient Register, which contains all hospital care in Sweden provided by public or private caregivers. Ethical approval for the SWEOLD study and the use of registers has been provided by the Regional Ethical Review Board in Stockholm (reg.no. 2010/403-31/4).

Material Dependent Variables. Planned and unplanned hospital admission between the interview and December 31, 2012 served as two dependent variables in the analyses. What constitutes planned and unplanned hospital admissions was determined by the national register, from which data were obtained. Both variables were coded as no admission (0) and admission (1).

Independent Variables. Sociodemographic and ability factors included gender, age in years, and years of education. There was also an item measuring one aspect of the respondents' ability to deal with public authorities, operationalized as: "Would you be able to write a letter yourself to appeal a decision made by a public authority?" with the response alternatives no (0) and yes (1).

Social factors covered both living and care situation and social interaction, and included the following: living and care situation, civil status, contacts with children, social contacts, social activity, and loneliness. Living and care situation was measured as living at home, that is, in ordinary housing, without home help (0), living at home with home help (1), and living in institution (2). Civil status was coded as married or cohabiting (0), widow/widower (1), and never married or divorced (2).

The assessment of contact with children was based on two items measuring how often the respondent met and spent time with or had telephone contact with own children, with six-point scales from seldom/never (0) to daily (5). These were summarized into a scale running from 0 to 10.

Social contacts were measured via four items concerning visiting and/or being visited by friends and/or relatives (response alternatives: no (0); yes, sometimes (1); yes, often (2)), summarized into a scale running from 0 to 8.

Social activity was measured via the item: "Which of the following activities do you usually do?", followed by a list of 11 activities (example items: going to the cinema, theater or concerts, eating out at restaurants, going on walks, or attending a religious service). Response categories were as follows: not at all (coded as 0), sometimes (1), and often (2), with a summary index score ranging from 0 to 22.

Loneliness was measured through the item: "Are you ever bothered by feelings of loneliness?" with four response categories. The response categories

were transformed into a dichotomous variable, indicating being frequently lonely (collapsing response categories: nearly always and often) and rarely lonely (collapsing response categories: seldom and almost never).

Independent health factors included number of illnesses/ailments and self-rated health. The respondent was asked: "Have you had any of the following illnesses or ailments during the last 12 months?", followed by a list of health problems: heart problems, arrhythmia/irregular heart rhythm, high blood pressure, mental illness, diabetes, urinary tract infections, disorders of the reproductive organs, rheumatism, coronary thrombosis/myocardial infarction, cerebral thrombosis/stroke, malignant tumor/cancer, lung problems, dementia, fractures, and Parkinson's disease (response categories: no (0); yes, mild problems (1); yes, severe problems (2)). These illnesses/ailments (hereafter called illnesses) were combined into a summarized index, ranging from 0 to 30. Self-rated health was measured via the item: "How do you view your general state of health?" (response categories "good" (0), "neither good nor bad" (1), and "poor" (2)).

Data Analysis

Analysis was directed toward determining the risk of planned and unplanned hospital admission among older people. As a first step, descriptive analyses were performed for the total sample, and for those who had planned and unplanned hospital admission. Secondly, bivariate analyses were performed to identify the relationship between planned/unplanned hospital admission (dependent variables) and independent variables. Phi tests were used for test of associations between dichotomous variables. For associations between nominal variables with more than two response categories, Cramer's *V* tests were used, and for continuous variables, Pearson correlation coefficient was used.

Finally, two Cox proportional hazard regression models were constructed to estimate the risk of planned and unplanned hospital admissions, measured in days from the interview date to the time of the event (hospital admission) or censoring at the end of the follow-up time. Correlation analyses and variance inflation factors (VIF) were used to check for possible multi-collinearity among independent variables. VIF values for all social factors were well below 10; VIF values below 10 are considered acceptable (Kleinbaum et al. 2008). To estimate the relative effects of independent variables on the logged hazard rate of hospital-based care (planned and unplanned), social factors were entered into models as a first block, sociodemographic and ability

factors as a second block, and health factors as a third block. Exponentiated regression coefficients (the relative hazards) from these models were interpreted as the change in the relative risk of hospital-based care associated with a unit change in the independent variable. For all analyses, the criterion for test significance was $p < .05$. Univariate and bivariate analyses were undertaken in *SPPS* version 23 (IBM Corp. Released 2015. IBM SPSS Statistics for Windows, Version 23.0. Armonk, NY: IBM Corp.), and Cox regression analyses were undertaken in *STATA* 12 (Thomson Higher Education, Duxbury Press, 10 Davis Drive, Belmont, CA 94002, USA). Sampling probability weight was used in all analysis to adjust for the oversampling of men aged 85 to 99 and women 90 to 99 years. All analyses were weighted via a weight variable adjusting for the likelihood for inclusion in the study in different age groups.

RESULTS

Sample Characteristics

Characteristics of the sample are presented in the first column of Table 1. Starting with sociodemographic and ability factors, 61.6 percent of the sample were women, the average age was 83.1 years, and they had an average of 8.70 years of education. Forty-four percent had high ability to deal with public authorities, meaning that they were able to write a letter of appeal.

In terms of social factors, the majority of the respondents lived at home without home help, while 16.3 lived at home with the support of home help and 11.3 percent lived in an institution. Forty-five percent of the sample were married or cohabiting, 41.7 percent were widowed, and 13.2 percent were divorced or never married. On average, the respondents scored 4.00 of 8 on the social contact scale and 5.85 of 10 on the contact with children scale. A total of 17.8 percent were frequently bothered by feelings of loneliness, and on average, they scored 5.01 of 22 on the social activity index.

Regarding health, 44.4 percent of the respondents rated their health as good, 41.9 percent as neither good nor bad, and 13.8 percent as poor, and they had an average of 2.35 of 30 on the illnesses index.

Planned and Unplanned Care: Bivariate Analyses

Table 1 also presents the prevalence of planned or unplanned hospital admission for the whole sample and within different subgroups of the sample and bivariate associations between hospital admissions and independent factors.

Table 1: Characteristics of the Sample, Prevalence of Planned and Unplanned Hospital Admission in Subgroups of the Sample, and Bivariate Associations between Planned and Unplanned Hospital Admission and Independent Factors (*n* = 931)

	Total	*Planned Hospital Admission*		*Unplanned Hospital Admission*	
	%	*%*	*φ*	*%*	*φ*
Total		15.0		40.7	
Female gender	61.6	13.8	−0.045	39.3	−0.037
Ability to deal with public authorities	43.8	18.9	.099**	36.1	−0.079*
Frequently lonely	17.8	11.9	−0.047	43.4	0.024
	%	*%*	*V*	*%*	*V*
Living and care situation					
At home without home help	72.5	16.2		36.2	
At home with home help	16.3	17.2		62.9	
Living in institution	11.3	3.81	0.112**	37.1	0.200***
Civil status					
Married/cohabiting	45.2	15.2		37.5	
Widow/widower	41.7	14.8		42.4	
Divorced/never married	13.2	15.6	0.008	46.7	0.066
Self-rated health					
Good	44.4	11.2		29.1	
Neither good nor bad	41.9	16.3		49.9	
Poor	13.8	24.4	0.122***	51.2	0.213***
	M (SD), Range	*M (SD), Range*	*r*	*M (SD), Range*	*r*
Age	83.1 (5.13), 76–101	82.2 (4.6), 76–100	−0.073*	84.2 (5.03), 76–99	0.167***
Years of education	8.70 (3.37), 2–27	9.06 (3.28), 6–20	0.046	8.71 (3.48), 3–27	0.003
Social contacts (0–8)	4.00 (1.97), 0–8	4.06 (2.01), 0–8	0.013	3.80 (2.00),0–8	−0.086**
Contacts w. children (0–10)	5.85 (2.98), 0–10	5.78 (3.02), 0–10	−0.011	5.93 (3.05), 0–10	0.021
Social activity (0–22)	5.01 (3.73), 0–17	4.94 (3.82), 0–17	−0.008	4.50 (3.63), 0–16	−0.113***
Illnesses (0–30)	2.35 (2.27), 0–14	2.85 (2.52) 0–12	0.092**	2.76 (2.56), 0–12	0.149***

Notes. Due to missing cases, for total sample, *n* = 904 for ability to deal with public authorities; *n* = 891 for loneliness; *n* = 930 for living and care situation; *n* = 928 for civil status; *n* = 921 for self-rated health; *n* = 919 for education; *n* = 928 for social contacts; *n* = 920 for contacts with children; *n* = 924 for social activity.
Significance levels: ***<.001; **<.010; *<.050.

Fifteen percent of the respondents had a planned hospital admission, and 40.7 percent had an unplanned hospital admission in the study period. The only social factor associated with planned hospital admissions was living and care situation, with living in an institution being negatively associated with such admissions. There was also a positive association between planned admissions and higher ability to deal with public authorities. Finally, planned admissions were associated with older age, poor self-rated health, and a higher number of illnesses.

Unplanned hospital admissions were associated with home help receipt, but also with lower levels of social contacts and social activity. Lower ability to deal with public authorities was associated with unplanned admissions. As with planned hospital admissions, there were associations with higher age and with both measures of poor health.

Multivariate Analyses

Table 2 presents the regression models for planned hospital admissions. It shows that living and care situation was the only social factor that was significantly associated with such admissions, with living in an institution being negatively associated with planned admissions. This association remained significant after adjusting for both sociodemographic and ability factors, and health factors in the regression models. In addition, higher ability to deal with public authorities was associated with planned hospital admissions, as was poorer levels of self-rated health.

Regression models for unplanned hospital admissions are presented in Table 3. Living and care situation was the only social factor that was significantly associated with unplanned hospital admissions, but for unplanned care living at home with home help was positively associated with admissions. This association remained significant after entering sociodemographic and ability factors and health factors into the analyses. Regarding sociodemographic and ability factors, higher age and male gender were associated with unplanned hospital admissions. Finally, both poorer levels of self-rated health and illnesses were associated with unplanned hospital admissions.

DISCUSSION

This study aimed to examine the relationship between social factors, including both social interaction and the social care situation, and planned and

Table 2: Models for Cox Regression of Factors Predicting Planned Hospital Admission (n = 818)

	Model 1			Model 2			Model 3		
	H.R.	95% CI for H.R.	p Value	H.R.	95% CI for H.R.	p Value	H.R.	95% CI for H.R.	p Value
Social factors									
Living and care situation									
At home without home help	1.0 (ref)			1.0 (ref)			1.0 (ref)		
At home with home help	1.07	0.62–1.83	.809	1.14	0.67–1.95	.630	0.97	0.56–1.66	.904
Living in institution	0.25	0.08–0.75	.013	0.31	0.10–0.95	.040	0.29	0.09–0.88	.029
Civil status									
Married/cohabiting	1.0 (ref)			1.0 (ref)			1.0 (ref)		
Widow/widower	1.04	0.66–1.65	.861	1.30	0.77–2.18	.329	1.30	0.77–2.18	.329
Divorced/never married	1.03	0.54–1.94	.936	1.13	0.59–2.17	.709	1.17	0.62–2.21	.618
Contact with children	0.98	0.92–1.05	.621	1.00	0.93–1.07	.906	1.00	0.93–1.08	.974
Social contacts	1.02	0.90–1.16	.753	1.02	0.90–1.16	.740	1.02	0.90–1.16	.722
Social activities	0.95	0.88–1.03	.232	0.93	0.85–1.01	.079	0.98	0.90–1.07	.643
Frequently lonely	0.71	0.39–1.27	.250	0.72	0.40–1.30	.279	0.61	0.33–1.11	.103
Sociodemographic and ability factors									
Age				0.97	0.93–1.01	.122	0.97	0.93–1.01	.207
Female gender				0.77	0.49–1.19	.238	0.82	0.52–1.29	.392
Years of education				1.00	0.95–1.06	.924	1.01	0.95–1.07	.812
Ability to deal with public authorities				1.52	0.97–2.39	.065	1.77	1.13–2.78	.013
Health factors									
Self-rated health									
Good							1.0 (ref)		
Neither good nor bad							1.91	1.15–3.19	.013
Poor							3.20	1.61–6.35	.001
Illnesses							1.08	0.99–1.19	.080

Note. Model 1 includes social factors only; Model 2 includes social factors and sociodemographic and ability factors; Model 3 includes social factors, sociodemographic and ability factors, and health factors.

Table 3:   Models for Cox Regression of Factors Predicting Unplanned Hospital Admission (*n* = 818)

	Model 1			Model 2			Model 3		
	H.R.	95% CI for H.R.	p Value	H.R.	95% CI for H.R.	p Value	H.R.	95% CI for H.R.	p Value
Social factors									
Living and care situation									
At home without home help	1.0 (ref)			1.0 (ref)			1.0 (ref)		
At home with home help	1.86	1.36–2.55	.000	1.72	1.25–2.37	.001	1.57	1.15–2.14	.004
Living in institution	0.92	0.59–1.42	.705	0.77	0.49–1.21	.261	0.72	0.46–1.13	.156
Civil status									
Married/cohabiting	1.0 (ref)			1.0 (ref)			1.0 (ref)		
Widow/widower	1.00	0.75–1.32	.975	1.01	0.74–1.40	.929	1.05	0.76–1.45	.778
Divorced/never married	1.14	0.78–1.66	.491	1.24	0.84–1.85	.275	1.27	0.86–1.88	.226
Contact with children	1.02	0.98–1.07	.310	1.02	0.98–1.07	.311	1.02	0.98–1.07	.319
Social contacts	0.97	0.90–1.04	.373	0.97	0.90–1.04	.410	0.97	0.90–1.04	.380
Social activities	0.96	0.92–1.01	.112	0.98	0.93–1.02	.300	1.01	0.97–1.06	.626
Frequently lonely	0.98	0.71–1.36	.911	1.00	0.72–1.38	.996	0.90	0.65–1.25	.532
Sociodemographic and ability factors									
Age				1.04	1.01–1.06	.004	1.04	1.02–1.07	.001
Female gender				0.72	0.55–0.94	.016	0.71	0.54–0.93	.011
Education				1.01	0.97–1.04	.658	1.01	0.97–1.05	.610
Ability to deal with public authorities				0.85	0.65–1.11	.237	0.93	0.71–1.22	.614
Health factors									
Self-rated health									
Good							1.0 (ref)		
Neither good nor bad							1.74	1.29–2.35	.000
Poor							1.71	1.12–2.62	.013
Illnesses							1.08	1.02–1.14	.009

Note. Model 1 includes social factors only; Model 2 includes social factors and sociodemographic and ability factors; Model 3 includes social factors, sociodemographic and ability factors, and health factors.

unplanned hospital admissions among older people. Data from a nationally representative survey of people aged 76 years or older were combined with national registry data on health care use. Multivariate analyses identified a negative association between living in an institution and planned admissions, and a positive association between receipt of home help and unplanned admissions. While there were associations between both lower levels of social contacts and lower levels of social activity and unplanned admissions, these were only significant in the bivariate analyses. Higher ability to deal with public authorities was positively associated with planned admissions and negatively associated with unplanned hospital admission, although only the association with planned admissions was significant in the multivariate model. In the multivariate model, male gender and higher age were associated with unplanned admissions. Finally, poorer levels of self-rated health were associated with both planned and unplanned hospital admissions, while illnesses were associated with unplanned admissions.

The only social factor that remained significantly associated with hospital admissions in the full models was living and care situation. There was a negative association between living in institutions and planned hospital admissions. People who enter institutional care are very frail and the time living in institution before dying has decreased dramatically over the last years in Sweden (Schön, Lagergren, and Kåreholt 2016). One interpretation of this finding is, therefore, that older people living in institutions are not seen as prioritized candidates for planned hospital treatments. This is in line with a Swedish study which has suggested that greater hospital care utilization among older people living at home than among older people in institutions could be explained by their better health status, better cognitive functioning, less dependency, and greater access to informal caregivers (Condelius et al. 2010). Furthermore, the authors of that study argued that people in institutions have lower levels of self-determination and that staff in institutions can act as gatekeepers for hospital care and also reduce the need for such care (Condelius et al. 2010).

We also found an association between receipt of home help and unplanned care. Previous research has shown that the amount of home help was higher in individuals who were admitted to hospital (not differentiating between planned/unplanned admissions; Landi et al. 2004) and that the number of unplanned hospital admissions decreased after the move to institutional care (Atramont et al. 2017). With the implementation of the aging in place strategy, there have been substantial cutbacks in Swedish institutional care since the early 2000s. This means that frail older people to a larger extent are living at home with the support of home help. Home help staff may, thus,

support older people in getting access to health care in emergencies and often hospital care is the only available alternative. Better integration between home help and primary care would be a way to improve the care situation at home, and the higher risk of unplanned hospital admission may also be a sign that home help only is not sufficient for certain groups of older people.

Social contacts and social activity were negatively associated with unplanned hospital admissions at bivariate level, but these associations were no longer significant when controlling for other factors. Higher levels of social contacts and activity are, thus, more likely to be associated with good health than with care use, which is in line with previous research (Holt-Lunstad et al. 2015). In our study, civil status and loneliness were not significantly associated with planned or unplanned hospital admissions, even though some previous research has found associations between civil status and/or living alone and hospital admissions (Landi et al. 2004; Inouye et al. 2008; Mu, Kecmanovic, and Hall 2015; Dolja-Gore et al. 2017), and between loneliness and planned and unplanned admissions (Molloy et al. 2010; Nägga et al. 2012; Taube et al. 2015; Rönneikkö et al. 2017). Although these social factors did not have any direct effect on hospital admissions in our study, it should be emphasized that such factors may still be influential for health care use, as social factors such as isolation and loneliness are associated with poor health (O'Luanaigh and Lawlor 2008; Holt-Lunstad et al. 2015). For example, previous research has found that while loneliness and low level of social participation were not associated with hospital admission, these factors were associated with longer length of stay in hospital and greater risk of readmission (Newall, McArthur, and Menec 2015). While length of stay and readmission were beyond the scope of this study, these are issues worth exploring in relation to social factors in future research, especially in the context of the development toward aging in place.

Higher ability to deal with public authorities was associated with planned hospital admissions, and was also negatively associated with unplanned admissions, albeit only at bivariate level. These findings reflect what has previously been discussed in terms of differing behavioral mechanisms behind planned and unplanned care use. While planned care use can be part of effective self-management of health (Molloy et al. 2010), unplanned health care can be caused by an inability to take care of oneself or by an insufficient care situation (Samaras et al. 2010; Gruneir, Silver, and Rochon 2011). Ability to deal with public authorities has been researched in relation to health and care utilization more specifically in terms of health literacy, and an association between poor health literacy and delayed health care access has been established (Levy and Janke 2016; see also Serper et al. 2014).

Strengths and Limitations of the Study

This study contributes to the knowledge of the relationship between social factors and hospital admission. It also demonstrates differences between unplanned and planned admissions. Methodological strengths of this study include that it was based on a nationally representative study with a high response rate, which means that the participants were highly representative of the population also including the most frail people and people living in institutions. This is particularly important in analyses of care use, as frail people are main users of care. These data were combined with national registry data on planned and unplanned hospital admissions, that is, reliable, valid, and complete data of health care utilization that were not compromised by recall bias. Another strength of the study is its longitudinal design. The availability of a broad illnesses variable enabled adjustment for a large number of illnesses in the multivariate analyses.

A potential weakness of this study is that it only covers hospital admissions and not visits in emergency departments that were not followed by hospital admissions or primary care such as visits at general practitioners. Social factors may be more influential on such forms of care. Participants in our study may also have had a multiple number of hospital admissions, and it is possible that an unplanned hospital admission leads to a subsequent planned hospital admission or vice versa. Such trajectories were not explored in this study. Neither did this study consider the severity of reason for admission or diagnoses of patients, which means that no conclusions can be drawn in relation to potentially avoidable hospital admissions. Another area for further research concerns length of stay at hospital, which can be particularly interesting as some social factors may be more influential on length of stay than on hospital admission, as mentioned above. Finally, it is possible that social factors measured at baseline have changed at the time of hospital admission, thereby underestimating the association between social factors and outcomes in terms of planned or unplanned hospital admission. However, given the relatively short follow-up period, this risk could be regarded as low.

CONCLUSIONS AND IMPLICATIONS FOR POLICY AND PRACTICE

Sweden has a universal health care system, meaning that services should be accessed based on need only. Still, even after controlling for health,

planned and unplanned hospital admissions were influenced by the social care situation of older people as well as by people's ability to deal with public authorities (measured as ability to write a letter of appeal). The negative association between institutional care and planned hospital admission reflects that people enter institutions at a very late stage in life. The positive association between receiving home help and unplanned hospital admissions suggests that older people need further support in their homes to avoid such admissions. Due to cutbacks in institutional care, more frail people live at home with support of informal and formal home care. This places demands on extended home care, receptive and available primary care, and integration between different sources of care (cf. Sirven and Rapp 2017). Further research is needed on how social factors may influence the use of acute care in emergency departments and general practitioners that do not lead to hospital admissions.

To reach the goal of equal access to health care for people with equal needs, interventions aiming at supporting individuals with low levels of ability to deal with public authorities and health literacy are required. For patients with low level of health literacy, readily available health information and support from care coordinators have been suggested (Serper et al. 2014).

Finally, it can be concluded that the utilization of health care is driven not only by the health status of the care-seeking individuals, but also by characteristics of these individuals and by their social context, and that different influencing factors can overlap and reinforce one another.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article:

Appendix SA1: Author Matrix.