

Loneliness and health care consumption among older people

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Few studies have investigated loneliness in relation to health care consumption among frail older people. The aim of this study was to examine loneliness, health-related quality of life (HRQoL), and health complaints in relation to health care consumption of in- and outpatient care among frail older people living at home. The study, with a cross-sectional design, comprised a sample of 153 respondents aged from 65 years (mean age 81.5 years) or older, who lived at home and were frail. Data was collected utilising structured interviews in the respondent's home assessing demographic data, loneliness, HRQoL and health complaints. Patient administrative registers were used to collect data on health care consumption. Loneliness was the dependent variable in the majority of the analyses and dichotomised. For group comparisons Student's *t*-test, Mann–Whitney *U*-test and Chi-square test were used. The results showed that 60% of the respondents had experienced loneliness during the previous

year, at least occasionally. The study identified that lonely respondents had a lower HRQoL ($p = 0.022$), with a higher total number of reported health complaints ($p = 0.001$), and used more outpatient services including more acute visits at the emergency department, compared to not lonely respondents ($p = 0.026$). Multiple linear regression analysis showed that a depressed mood was independently associated to total use of outpatient care ($B = 7.4$, $p < 0.001$). Therefore, it might not be loneliness, *per se*, that is the reason for seeking health care. However, reasons for using health care services are difficult to determine due to the complex situation for the frail older person. To avoid emergency department visits and to benefit the well-being of the frail older person, interventions targeting the complex health situation, including loneliness, are suggested.

Keywords: frail, health-related quality of life, health complaints, inpatient care, outpatient care.

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Introduction

It has been emphasised that health personnel and policy makers should be aware of loneliness as a condition that needs to be taken seriously and intervened due to adverse health outcomes (1, 2). Loneliness and related health outcomes could possibly result in an increased need for health care for the older person. However, few studies have investigated the relationship between loneliness and health care consumption among older people. To raise awareness among health care providers, identify older persons at risk, allocate resources and successfully intervene, knowledge is needed not only regarding

loneliness in relation to health, but also regarding the consumption of in- and outpatient care.

Loneliness is an unpleasant experience that occur when a person's network is inadequate in some important way, quantitatively or qualitatively (3). It has been found that around 40% of older people, mainly in the western countries (e.g. Europe and the US), are reported to be lonely sometimes or often (4–6). Research indicates that loneliness increases with age, especially among the elderly (7, 8). This has been shown to be partly due to deterioration in health and/or loss of spouse (8). Moreover, loneliness, as shown in previous research, is associated with higher age, multiple morbidities (7), changes to mobility (9), depression (1), health-related quality of life (HRQoL), and living alone (10) among others. Thus, loneliness is a common problem among older people that needs to be accounted for in the caring process, with frail older people, in particular, appearing to be at higher risk of experiencing loneliness. Frailty can be seen as an

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age-related decline resulting in a vulnerability to external stressors with difficulties to recover (11). From a clinical perspective, one simple and useful definition of frailty is being dependent in activities in daily living (ADL), with the need for frequent use of institutional care (12). The vulnerability resulting from being frail and the adverse health outcomes associated with loneliness highlights the importance of identifying and providing support for those people who are lonely or at risk of becoming lonely. However, the health care system, as it is today, tends to mainly focus on single diseases, with less emphasis on complex medical and social needs.

As stated by Rockwood et al. (13, p. 35):

The problem facing all health-care systems for ageing populations is not the burden of single illnesses. Rather it is that these illnesses are occurring in people with many other things wrong, yet people are being treated by health-care systems designed for people who only have one illness active at time.

Loneliness could be seen as a problem co-existing with other illnesses, and in order to meet the needs among frail older people, knowledge regarding health care consumption is useful. However, research concerning loneliness in relation to health care consumption among older people is very limited. Moreover, research on frail older people, in particular, is also limited, both regarding loneliness in relation to health aspects such as HRQoL and health complaints, as well as loneliness in relation to health care consumption. Previous research has shown that frail older people who are lonely, have a poorer subjective health and higher risk of depression compared to those peers who are not lonely (14). Molloy et al. (15) found that greater loneliness was independently associated with acute hospital admissions, but there was no association between planned inpatient admissions and loneliness. On the other hand, Jakobsson et al. (16) found that older people who were lonely were prone to use more inpatient care services, compared to older people who were less lonely. Research regarding the use of outpatient services has shown that older people who are lonely have more contact with physicians compared to older people who are less lonely (17). However, there is limited knowledge about how loneliness is associated with health care consumption. There is a void in existing knowledge specifically concerning frail older people living at home, who experience loneliness, in terms of prevalence, health aspects as well as health care consumption. Research within this scope could provide insight into the topic and contribute to further understanding of the complex situation for the frail older person, with this knowledge being potentially useful in the development of interventions. Therefore, the aim of this study was to examine loneliness, HRQoL and health complaints in relation to health care consumption of in- and outpatient care among frail older people living at home.

Method

Sample and setting

The study sample comprised 153 participants aged 65 years or older (mean age 81.5 years) and was drawn from the baseline assessment of an ongoing randomised controlled trial (RCT) aiming to evaluate the effectiveness of a health care model with case managers to people (≥ 65 years) with dependency in ADL, repeated contacts with the health care services, and living their own home. The setting was a Swedish municipality in the County of Skåne with approximately 30 000 inhabitants. Participants were consecutively recruited between October 2006 and April 2010 from three primary health care centres in the municipality ($n = 117$), by the participants contacting the research group themselves ($n = 3$), three clinics at the university hospital ($n = 20$) or through the municipal home care ($n = 13$). At the hospital, the nurses involved in the RCT searched the three clinics for potential participants and informed about the study. When consent was given, the potential participant was contacted by a member of the research team for further information and assessment. In primary and municipal care, staff identified possible participants who were contacted by the research team for further information and eligibility assessment. Information leaflets were posted at various setting so that potential participants could contact the research team for information. In addition, a screening procedure was performed on two occasions at two primary care centres in the municipality, where all those aged 65+ with four or more registered visits the previous year were contacted by telephone or mail with information. Those contacted by mail also got a prepaid envelope and a reply form and were asked to send in consent that they allowed the research team to contact them to give additional information. A total of 1079 potential participants were approached. Of these, 926 were excluded: 231 did not meet the inclusion criteria, seven died before randomisation and 688 could not be randomised. The main reason for not being randomised was failure to respond to the letter in the primary care register recruitment procedure ($n = 571$). Other reasons were inability to contact prospective participants ($n = 28$), unwillingness to participate ($n = 71$), or prospective participants feeling too tired or too ill ($n = 18$; Fig. 1).

Inclusion criteria was that the participants should be in need of assistance with two or more self-reported ADL, had been admitted to hospital on two or more occasions, or had been in contact with primary/outpatient care at least four times or more during the last 12 months. The participants were also required to be able to communicate verbally and have no cognitive impairment. Cognitive status was measured at baseline with the

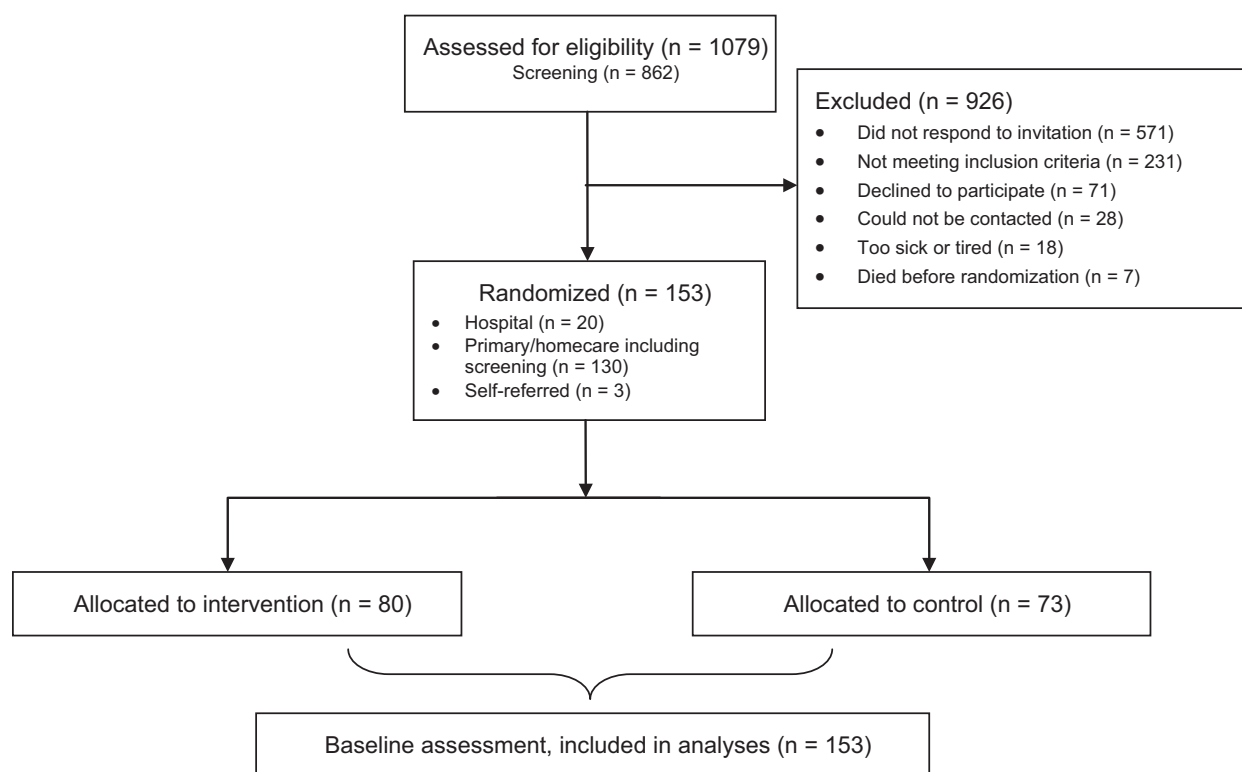


Figure 1 Flow diagram over the recruitment procedure.

Mini Mental State Examination (MMSE) scoring from 0 to 30 points, where 30 points indicates no cognitive impairment (18). A cut-off value was used in the study excluding participants with scores below 25 points.

Data collection and assessments

All data, except health care consumption data, was collected by means of structured interviews in the participant's home. The baseline data was collected between October 2006 and April 2010.

Four single-item questions were used to assess loneliness. This was based on subjective judgment by the respondent regarding the prevalence both retrospectively and present (i.e. at the time of the data collection), comparability with others of the same age and intensity. The response alternatives covered a range from no feelings of loneliness to a constant, strong feeling of loneliness. The four single-item questions were 'Looking back over the last year, which response alternative corresponds best for you?', 'On the whole, do you believe that you feel lonelier than others of your age?', 'When you feel lonely, how strong is your feeling of loneliness?' and 'Do you feel lonely nowadays?'

The EuroQol instrument (EQ-5D) was used to assess HRQoL and cover five dimensions of health: mobility, self-care, usual activities, pain/discomfort and anxiety/depression (19). There are three response levels (no

problems, some problems, severe problems) used. The five dimensions and the three response levels generate 3^5 or 243 possible health states (19). A regression technique, resulting in a tariff, was used to generate values based on the 243 health states, ranging from -0.54 to 1.00 (perfect health) (20, 21). The EQ-5D also contains a visual analogue scale (VAS), ranging from 0 (worst imaginable health state) to 100 (best imaginable health state) on which the participant was asked to score his/her current health status (19).

A total of 32 questions regarding common health complaints among older people were used by assessing presence and severity during the last 3 months with four response alternatives (no, yes, little, yes, quite a lot, yes and very much). The original questions were developed by Tibblin et al. (22) and then revised by adding response alternatives and symptoms in a later study (23).

Health care consumption data was collected from two patient administrative registers in a time frame between 12 to zero months prior to collection of the baseline data. These two registers were: Patient Administrative Support in Skåne (PASIS), which is a register for all publicly organised in- and outpatient health care in the county council in the region of Skåne, Sweden, and PrivaStat, which is the register for all privately organised outpatient care in the same region. Variables used in this study were based on data regarding the use of in- and outpatient care. In regard to inpatient care, the number of visits and

length of stay for acute and planned care were included, and for outpatient care as follows; the number of visits and contacts (face to face, telephone, other) with a physician and number of visits at the emergency department leading to admission to hospital or not. It should be noted that an acute admission could occur at any ward at the hospital and was registered as inpatient care. Visits at the emergency department were registered as outpatient care and could be categorised into visits leading to hospital admission or not.

Data analysis

Loneliness was the dependent variable in the majority of analyses and dichotomised as 'not lonely' (0) and 'lonely' (1) based on the question 'Looking back at the last year, which of the following alternative corresponds with you?' with four response alternatives. The 'not lonely' group (0) included those individuals who answered, 'I have not felt lonely at any occasion the last year' and the 'lonely group' (1) included those who answered, 'I have experienced single occasions of loneliness', 'I have experienced recurring periods of loneliness' and 'More or less, I have experienced a constant feeling of loneliness'. A dichotomisation for each health complaint (0 = 'no'-alternative, 1 = 'yes'-alternatives) was also made. In this study, Student's *t*-test was used for normally distributed interval/ratio data, the Mann-Whitney *U*-test was used for ordinal and interval/ratio data, which was not normally distributed and for nominal data the chi-square test was used. A multiple linear regression analysis (backward, manual) was performed to identify possible associated variables to health care consumption. The dependent variable was 'Total number of visits for outpatient care', i.e. number of contacts with a

physician (face to face visits, telephone contacts, and other) and the number of acute visits at an emergency department leading to and not leading to hospital admission. The independent variables were lonely, HRQoL (EQ-5D total score) and following health complaints (i.e. those significant in the bivariate analyses): difficulties hearing, memory problems, dizziness, loss of appetite, nervous and depressed mood. In addition, the model controlled for age. To rule out possible multicollinearity, an estimated tolerance index and variance inflations factors (VIF) were used and the tests indicated no such risk. The distribution of residuals was visually judged through a plot of residuals, supporting the assumption of homoscedasticity (24). A normal probability plot of the residuals showed no deviations from normality. Finally, a *p*-value <0.05 was considered as statistically significant for all performed analyses.

Ethical considerations

This study was conducted in accordance with the Declaration of Helsinki (25) and has been approved by the Ethics Committee at Lund University (LU 342/2006; 499/2008). Verbal and written informed consent was obtained from all participants in the study.

Results

The majority of the participants were women (67%), with 49% widowed, and a significant difference (*p* <0.001) in marital status between those participants who reported loneliness and those who did not (Table 1). Among the widowed, 67% reported loneliness compared to 16% among those who were still married (Table 1).

Table 1 Demographic variables at baseline, including a comparison between groups of those not lonely and lonely respondents based on prevalence of loneliness

	Total sample (N = 153)	Not Lonely ^a (n = 61)	Lonely ^a (n = 92)	<i>p</i> -Value ^b
Age mean ± (SD)	81.5 (6.4)	80.6 (6.5)	82.1 (6.2)	0.135 ^c
Gender (%)				0.134 ^d
Women	66.7	60.7	70.7	
Civil Status (%)				<0.001^d
Married/Registered Partner/Co-habitant	34.0	60.7	16.3	
Widowed/-er	49.0	21.3	67.4	
Other ^e	17.0	18.0	16.3	
Children (%)				0.439 ^d
Yes	88.2	86.9	89.0	

^aNot Lonely and Lonely is based on the question 'Looking back over the last year, which response alternative corresponds best for you?' (no = 0/yes = 1), capturing the prevalence of loneliness during the last year.

^bComparison between being Not Lonely and Lonely.

^cStudent's *t*-test.

^dchi-square test.

^eLive-apart, divorced, other.

Significant values are in bold.

Loneliness, HRQoL and health complaints

From a retrospective point of view, i.e. frequency of experienced loneliness during the last year, 60% of the participants reported loneliness, ranging from a single occasion to a constant feeling of loneliness, and 24% reported feeling lonely in the present (Table 2). In comparison with other peers, 31% considered they were less lonely than their peers and a minority (7%) considered themselves to be lonelier (Table 2).

The 'not lonely' and 'lonely' participants differed significantly regarding HRQoL, as assessed by the EQ-5D and the EQ-VAS, as well as in the total number of health complaints and several specific health symptoms (Table 3). For the specific health complaints, six of the 32 complaints had a significant higher prevalence among participants reporting loneliness compared to those who did not, namely: difficulties hearing (58% vs. 38%), memory problems (61% vs. 44%), dizziness (59% vs. 41%), loss of appetite (28% vs. 5%), nervousness (53% vs. 28%) and depressed mood (51% vs. 23%; Table 3). Having difficulties walking was the most frequently reported health complaint in the total sample (72%) as

well as among the not lonely (69%) and the lonely (74%) participants (Table 3).

Health care consumption

The study highlighted that participants reporting loneliness used significantly more outpatient services than participants not reporting loneliness. Those reporting loneliness had more contacts in total with a physician (mean, $m = 23.2$, $SD \pm 13.3$ vs. $m = 19.5$, $SD \pm 9.0$, $p = 0.040$), and more acute visits to an emergency department ($m = 1.3$, $SD \pm 1.6$ vs. $m = 0.7$, $SD \pm 0.9$, $p = 0.009$) as well as total visits in outpatient care ($m = 24.5$, $SD \pm 14.1$ vs. $m = 20.2$, $SD \pm 9.4$, $p = 0.026$; Table 4). No significant differences between the two groups were found regarding use of inpatient care (Table 4). In the next step, when performing multiple linear regression analysis to identify associated variables to health care consumption, the final regression model ($n = 153$) identified one significant variable that explained 11% of the variance in the model (Adj. $R^2 = 0.11$). Namely, depressed mood, which was found to be associated with the total use of outpatient care (B , unstandardised = 7.4, $p < 0.001$).

Table 2 Prevalence of loneliness (%)

<i>Total sample (N = 153)</i>	
Looking back over the last year, which response alternative corresponds best for you?	
No occasions with feelings of loneliness	39.6
Single occasions w. feelings of loneliness	35.9
Recurring periods w. feelings of loneliness	15.7
Constant feeling of loneliness	8.5
On the whole, do you believe that you feel lonelier than others of your age? ^a	
Much more lonely	2.7
Slightly more lonely	4.0
Just as lonely as others	24.0
Slightly less lonely	17.3
Much less lonely	14.0
Never lonely	38.0
When you feel lonely, how strong is your feeling of loneliness? ^b	
Very strong	6.7
Rather strong	11.4
Neither strong nor weak	14.8
Rather weak	21.5
Very weak	5.4
Never lonely	40.3
Do you feel lonely nowadays? ^c	
Yes, I feel very lonely	7.4
Yes, I feel rather lonely	17.0
No, I do not feel lonely	75.6

^aMissing: $n = 3$.

^bMissing: $n = 4$.

^cMissing: $n = 18$.

Discussion

This study showed that frail older people who are lonely use significantly more outpatient services including visits at the emergency department, compared to frail older people who are not lonely. However, when investigating the association between loneliness, HRQoL, health complaints and consumption of outpatient care the analyses indicates that it might not be loneliness *per se* that is independently associated with use of health care but rather depressed mood.

There are limitations and strengths of this study that need to be addressed in relation to the findings. First of all, loneliness was assessed by single-item questions which could be seen as a threat to internal validity as it assumes that the respondent understands the definition of loneliness. Although loneliness is a well-known construct, the possibility of misinterpretation cannot be ruled out. However, assessing loneliness through a single-item question has advantages as it is easy to use in clinical and research settings and approaches direct feelings of loneliness (1). Secondly, there is also a risk of bias in terms of social desirability due to the fact that feeling lonely usually has negative connotations (5) which could potentially have led to an under reporting of the experience. Moreover, in this study, the respondents were defined as frail due to functional dependency in daily life and repeated contact with health care services, which is in line with previous reported potential consequences of frailty (26, 27). The basis for the definition of frail used in this study could be seen as consequences of frailty

Table 3 HRQoL and Health Complaints, including a comparison between groups of not lonely and lonely respondents based on prevalence of loneliness

	Total sample (N = 153)	Not Lonely ^a (n = 61)	Lonely ^a (n = 92)	p-Value ^b
HRQoL, EQ-5D ^c mean ± (SD)	0.59 (0.27)	0.63 (0.27)	0.56 (0.28)	0.022^d
HRQoL, EQ-5D _{VAS} ^e mean ± (SD)	60.3 (17.5)	65.7 (14.2)	56.7 (18.7)	0.001^d
Total number of health complaints mean ± (SD)	11.2 (4.7)	9.8 (4.7)	12.1 (4.6)	0.001^d
Health complaints (%)				
Difficulty hearing	49.7	37.7	57.6	0.016^f
Difficulty reading	28.1	24.6	30.4	0.413 ^f
Difficulty talking	23.5	18.0	27.2	0.192 ^f
Memory problems	54.2	44.3	60.9	0.043^f
Dizziness	51.6	41.0	58.7	0.032^f
Unsteadiness	69.7	68.2	71.1	0.764 ^f
Headache	22.9	18.0	26.1	0.246 ^f
Nausea	13.7	13.1	14.1	0.858 ^f
Difficulty swallowing	14.4	11.5	16.3	0.405 ^f
Abdominal pain	28.1	19.7	33.7	0.059 ^f
Loss of appetite	19.0	4.9	28.3	<0.001^f
Constipation	33.3	27.9	37.0	0.243 ^f
Diarrhoea	15.7	11.5	18.5	0.244 ^f
Difficulty controlling faeces ^c	10.5	9.8	11.0	0.858 ^f
Difficulty controlling urine	43.0	45.9	41.1	0.560 ^f
Other urinary symptoms ^c	11.8	9.8	13.2	0.531 ^f
Pain in extremities	69.9	63.9	73.9	0.188 ^f
Pain	49.7	55.7	45.7	0.222 ^f
Difficulty walking	71.9	68.9	73.9	0.495 ^f
Mobility limitations	50.7	54.1	48.4	0.487 ^f
Oedema in legs	47.1	41.0	51.1	0.220 ^f
Slow-healing wounds	11.1	9.8	12.0	0.683 ^f
Chest pain	21.6	14.8	26.1	0.095 ^f
Palpitation	25.5	24.6	26.1	0.835 ^f
Coughing	22.9	24.6	21.7	0.681 ^f
Breathlessness	56.9	55.7	57.6	0.819 ^f
Dyspnoea	21.6	18.0	23.9	0.387 ^f
Fatigue	56.2	49.2	60.9	0.154 ^f
Difficulty with sleeping	54.2	45.9	59.8	0.092 ^f
Nervousness	43.1	27.9	53.3	0.002^f
Depressed mood	39.9	23.0	51.1	0.001^f
Other	17.0	16.4	17.4	0.872 ^f

^aNot Lonely and Lonely is based on the question 'Looking back over the last year, which response alternative corresponds best for you?' (no = 0/yes = 1), capturing the prevalence of loneliness during the last year.

^bComparison between Not Lonely and Lonely.

^cMissing n = 1.

^dMann-Whitney U-test.

^eMissing n = 3.

^fchi-square test.

Significant values are in bold.

rather than a criterion of frailty. However, frailty has been defined as dependent in ADL and frequent use of institutional care (12), and the well-documented consequences of frailty, which applies to the sample, suggest that there is a valid rationale behind the definition of frailty in this study. The sample was drawn from the baseline assessment of a study with an experimental design, specifically targeting older people who were frail. This has implications for the external validity in terms of

a difficulty in generalising the results among older people in general. However, frail older people are less well studied and the results of this study give further indication of the health and needs among people who are frail. Thus, the findings could potentially be transferred to other settings involving frail older people, although possible differences in health care systems should be considered. Finally, due to the study design, it was not possible to establish causality. It is therefore suggested that the

Table 4 Median value (md), quartiles and range for in and outpatient care consumption one year prior to gathering of baseline data, including a comparison between not lonely and lonely respondents based on the prevalence of loneliness

	Total sample (N = 153)			Not Lonely ^a (n = 61)			Lonely ^a (n = 92)			p-Value ^b
	md	q1–q3	range	md	q1–q3	range	md	q1–q3	range	
Inpatient care										
Acute ^c	0.0	0.0–1.0	0–5	0.0	0.0–1.0	0–3	0.0	0.0–2.0	0–5	0.071
Length of stay	0.0	0.0–8.0	0–91	0.0	0.0–6.5	0–43	0.0	0.0–9.0	0–91	0.183
Planned ^c	0.0	0.0–0.0	0–6	0.0	0.0–0.0	0–2	0.0	0.0–0.0	0–6	0.926
Length of stay	0.0	0.0–0.0	0–37	0.0	0.0–0.0	0–21	0.0	0.0–0.0	0–37	0.980
Admissions in total ^d	1.0	0.0–2.0	0–8	1.0	0.0–1.0	0–3	1.0	0.0–2.0	0–8	0.106
Length of stay	1.0	0.0–9.0	0–91	1.0	0.0–8.0	0–43	0.5	0.0–10.5	0–91	0.229
Outpatient care										
Visits physician	10.0	7.0–13.5	1–41	11.0	7.0–14.0	2–23	10.0	7.0–13.8	1–41	0.508
Contacts in total ^e	19.0	14.0–27.0	5–66	17.0	13.0–24.5	5–51	20.0	14.0–30.0	5–66	0.040
Acute visits ^f	1.0	0.0–2.0	0–7	0.0	0.0–1.0	0–4	1.0	0.0–2.0	0–7	0.009
Acute visits leading to Admission ^{c,f}	0.0	0.0–1.0	0–4	0.0	0.0–1.0	0–3	0.0	0.0–1.0	0–4	0.029
Acute visits not leading to admission ^{c,f}	0.0	0.0–1.0	0–4	0.0	0.0–0.0	0–2	0.0	0.0–1.0	0–4	0.069
Total visits ^g	20.0	14.0–29.5	5–69	18.0	13.0–25.5	5–52	21.0	14.25–30.0	5–69	0.026

^aNot Lonely and Lonely is based on the question: 'Looking back over the last year, which response alternative corresponds best for you?' (no = 0/yes = 1).

^bStudent's *t*-test.

^cAdmissions to hospital.

^dAcute and planned admissions to hospital.

^eTotal number of visits, telephone contact and other contact with a physician.

^fAcute outpatient visits at an emergency department.

^gTotal no. of visits for outpatient care regarding the total no. of contacts in total with a physician^e and acute visits at an emergency department leading to and not leading to an admission to hospital.

Significant values are in bold.

results should be interpreted in the light of identified associations, although without the possibility to predict.

This study showed that loneliness is common among frail older people, with 60% of the participants having experienced loneliness on a single occasion or more often during the last year. However, around one-fourth of the participants felt lonely in the present (i.e. at the time when data was collected), indicating that there is a discrepancy in relating to loneliness in the present versus retrospectively. It was not possible to further investigate reasons for this discrepancy within the scope of this study. Nevertheless, the prevalence of feeling lonely in present time appears to be in line with previous research (1, 6, 28) and indicates that frail older people do not differ from other older people in general in terms of prevalence of feeling lonely. However, there is a challenge to compare prevalence due to various assessments, samples and context. Loneliness among older people is also known to have adverse health outcomes (28), and this study showed that those reporting loneliness had a poorer overall health, both physically and psychologically, compared to their 'not lonely' peers. This finding could be explained by the notion of a frailty identity crisis presented by Fillit et al. (29), where going from independence to dependency poses a psychological challenging transition that could be accompanied by regret,

sadness and depression, and which in turn could affect physical frailty. Our study was not aiming to investigate this concept; however, loneliness and depression is known to be associated (28, 30), and the relationship can be reciprocal (1). Thus, it is not possible to isolate loneliness as a single cause to poorer overall health, but rather, as a factor in the complex web of causal relationships.

Another main finding in this study was that frail older people who were lonely also used significantly more outpatient services compared to those who were not lonely, with more contacts made with a physician at the primary care facility and more visits at an emergency department, as an outpatient. It can be difficult to explain our findings in the light of previous research as studies focusing on loneliness among older people in relation to health care consumption mainly focus on inpatient care. However, Cheng (17) showed that loneliness had a direct effect on physician utilisation among older women (65+ years) and that the distress of loneliness also increased outpatient visits due to its impact on health and somatisation. It is possible that when the frail older person has a need, be it physical or psychosocial, turning to the primary care facility offers accessibility and a possible continuity, which could explain the higher use of outpatient services. When comparing inpatient care

between frail older people who were lonely and those that are not lonely, no significant differences were found between the two groups in relation to use of inpatient services. Our finding, in particular regarding the need for planned inpatient care, is confirmed by previous research (15). In our study, when comparing the number of visits at an emergency department, including visits that led to admission (i.e. outpatient care leading to inpatient care), there was a significant difference where 'lonely' respondents had more visits compared to 'not lonely' respondents. Molloy et al. (15) presents similar results and concludes that greater loneliness is independently associated with acute admissions. Reasons why frail older people required more care at an emergency department were beyond the scope of this study. However, a possible explanation could be that frail older people who are lonely might lack adequate or appropriate support and care for them at home and when their primary care facility is not accessible for some reason, they turn to an emergency department and are admitted as this may be the only option suitable or available. Although loneliness is not merely comparable with lacking a caregiver, it is reasonable to assume that those who are lonely are also lacking someone close, who possibly could have been their informal caregiver.

When taking loneliness, HRQoL and health complaints into account in relation to use of outpatient services, multiple linear regression analysis revealed that suffering from depressed mood solely was associated with higher health care consumption. Thus, it might not be loneliness *per se*, that is associated with use of health care. Nevertheless, the results suggest that psychological well-being is an important factor when seeking health care. However, the model in our study explained 11% of the variance, meaning that depressed mood explained 11% of the total use of outpatient services. This indicates that it is difficult to predict health care consumption for frail older people who often have multiple illnesses and needs, which also has been shown in previous research (31).

The findings from this study highlight the clinical importance of recognising loneliness as a potential problem for the frail older person and this is especially important in regard to outpatient care where those who are lonely significantly differs from those who are not in terms of health care consumption. Emergency care does not respond to the complex needs of older patients which often have a combination of medical, functional and social needs (32), with specific skills in geriatric care often lacking (33). By offering support at the primary care facility through assessing loneliness as well as other psychosocial aspects that might be a problem for the frail older person could result in possible benefits for the health care system and above all, for the well-being of the frail older person.

Implications for future research involve further investigation into the relationship between loneliness and health care consumption among frail older people, especially regarding outpatient care as well as in terms of investigating directions of causality and health care consumption patterns. Moreover, development and evaluation of tailored intervention studies focusing on the complex health situation among frail older people, including loneliness and related psychosocial aspects, should be developed to meet the needs of the frail older person and possibly avoid emergency department visits as well as enhancing the well-being.

Conclusion

Frail older people do not differ from other older people in general in terms of prevalence of feeling lonely. Those frail older persons who were lonely had poorer overall health, both physically and psychosocially compared to their 'not lonely' peers. When comparing use of in- and outpatient services, frail older people who were lonely used significantly more outpatient services, including visits at an emergency department compared to those who were not lonely. The multiple linear regression analysis revealed that it was a depressed mood that solely was associated with use of outpatient care. The difficulty in determining reasons for using health care services due to multiple illnesses and the needs among frail older people should be noted. To avoid emergency department visits and benefit the well-being of the frail older person, tailored interventions focusing on support for frail older people with regards to the complex health situation as well as loneliness, are emphasised.

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Author contributions

Elin Taube contributed to the design of the study, data collection, statistical analysis, interpretation of data and drafting of the manuscript. Dr. Magnus Sandberg involved in data collection, interpretation of data, contribution to the manuscript and critical revision. Dr. Jimmie Kristensson and Dr. Patrik Midlöv were responsible for the design of the study, interpretation of data, contribution to the manuscript and critical revision. Dr. Ulf Jakobsson was responsible for the design of the study,

statistical analysis, interpretation of data, contribution to the manuscript and critical revision.

Ethical approval

The study was approved by the Regional Ethical Review Board in Lund (LU 342/2006, LU 499/2008).

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