



Original Article

Prevalence and clinical significance of loneliness in older patients admitted to acute hospital wards



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ABSTRACT

Objective: Loneliness represents a risk factor for morbidity and mortality. We aimed to evaluate the prevalence of loneliness among hospitalized older patients, and its association with baseline characteristics and clinical post-discharge outcomes.

Design: Multicenter observational study, including a cross-sectional and a longitudinal phase.

Setting: Acute medical hospital wards of three Italian hospitals.

Participants: Three hundred patients ≥ 65 years old.

Measurements: A questionnaire was administered to participants, including socio-demographic data, and information on loneliness (assessed with 3-item UCLA scale and 6-item De Jong Gierveld and Van Tilburg Loneliness scale-DJGT), cognitive, emotional and functional level. Rehospitalizations and mortality were evaluated 1 and 6 months after discharge.

Results: A high prevalence of loneliness emerged with both scales (63% with UCLA, 60% with DJGT). At multiple linear regression analyses, Geriatric Depression Scale (GDS) was independently associated with UCLA (B coeff. 0.46, $p < 0.001$) and DJGT (B coeff. 0.51, $p < 0.001$) scales, and Basic Activities of Daily Living with UCLA scale (B coeff. -0.21 , $p = 0.02$). In longitudinal analysis, global loneliness scores were not associated with mortality and rehospitalization risk, while the item n.6 of DJGT scale ("There are enough people I feel close to") was independently associated with higher mortality risk within 1 and 6 months from discharge (OR 4.6, 95%CI 1.64–12.92; OR 4.38, 95%CI 1.83–10.48, respectively).

Conclusion: Loneliness was reported by more than half of older adults hospitalized in acute medical wards, and was associated with depressive symptoms and disability. The perception of scarce social ties was associated with higher mortality risk. Awareness of the "loneliness" phenomenon should be increased also in clinical settings.

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1. Introduction

Several studies have highlighted the importance of social relationships in promoting mental health and in reducing overall morbidity and mortality rates [1]. Conversely, feelings of loneliness have been associated with decreased life expectancy and increased morbidity [2,3]. Loneliness is characterized by a negative emotional state arising from a discrepancy between desired and perceived relationships [4] and

this implies that it's possible to experience loneliness despite being surrounded by people. Thus, loneliness is distinct from social isolation, which refers to an objective condition marked by minimal social contact with others [2].

This subjective experience is challenging to discern externally, making research in this field particularly complex. Older adults face an elevated risk of loneliness due to socio-demographic, psychosocial, and healthcare factors. The prevalence of loneliness among older

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individuals is high worldwide, though estimates vary across studies due to differences in measurement methods, studied populations, and age groups involved. According to a survey by the American Association of Retired Persons (AARP), approximately 25% of Americans aged 70 and older living in communities reported feelings of loneliness [5]. Similar findings have been reported in a recent meta-analysis including national representative samples from various European countries, with higher rates of loneliness in Eastern than in Western countries and mean prevalence ranging between 11% and 26% when measured with validated scales among subjects aged 60+ [6]. In China, a national survey found that 29.6% of individuals aged 60 and older reported frequent feelings of loneliness [7].

The experience of hospitalization, disrupting everyday life, constitutes a condition at high risk of loneliness. Data on loneliness prevalence in the hospital setting are limited to very few clinical samples, with a prevalence ranging between 37% [8] and about 63% [9]. In another study, 75% of older patients admitted to a geriatric ward report feeling lonely, with negative emotions such as sadness, anxiety, anger, guilt, and feelings of abandonment, worthlessness, and confinement [10].

The aims of our study were: 1. To determine the prevalence of loneliness among older patients admitted to Internal Medicine/Geriatrics acute hospital wards; 2. To evaluate the association between loneliness and patients' characteristics (socio-demographic, clinical, functional, cognitive, and emotional factors) and post-discharge clinical outcomes (1- and 6-month total mortality and rehospitalization rates).

2. Methods

2.1. Study population

In this multicenter observational prospective study, we included 300 patients ≥ 65 years old, admitted to acute care wards of three Italian hospitals between January 2021 and May 2022. The sample included:

- 118 patients from the University Internal Medicine Unit, S. Anna University Hospital of Ferrara;
- 116 patients from the Geriatrics Unit (and Geriatric Emergency Care and Research Center for Aging) of the IRCCS INRCA of Ancona;
- 66 patients from the Geriatrics (and Intensive Care) Unit of Careggi University Hospital of Firenze.

Older patients consecutively admitted to the aforementioned acute care wards were assessed for participation to the study. Eligible patients were adequately informed about the research project and invited to participate to the study. Written informed consent was obtained from each subject who agreed to join the study. The study was approved by the Local Ethic Committee of S. Anna University Hospital of Ferrara - Italy (protocol n. 769/2019/Oss/AOUFe).

The only inclusion criterion was age ≥ 65 years, while exclusion criteria included:

- presence of delirium at the time of assessment, defined by a score on the 4AT Scale >3 [11];
- severe cognitive impairment, defined by >7 errors on the Short Portable Mental Status Questionnaire (SPMSQ) [12];
- language barrier, terminal conditions, unstable haemodynamic conditions, severe organ failure.

2.2. Questionnaire

Data collection was conducted by administering a questionnaire to each patient within 48 h from admission to the ward. *Socio-demographic characteristics* of the study population included age, sex, marital status and living situation (living alone).

Prevalence of *loneliness* was examined with two different scales: the 3-Item UCLA Loneliness Scale [13,14], and the 6-item De Jong Gierveld and Van Tilburg Loneliness Scale (DJGT) [15,16]. The UCLA Loneliness Scale

includes the following 3 items: "How often do you feel that you lack companionship?", "How often do you feel left out?" and "How often do you feel isolated from others?" (possible answers: hardly ever, some of the time, and often).

The 6-item DJGT consists of six different questions, with three possible answers, to investigate both emotional loneliness ("I experience a general sense of emptiness", "I miss having people around", "I often feel rejected"; possible answers: yes = 1, more or less = 1, no = 0), and social loneliness ("There are plenty of people I can rely on when I have problems", "There are many people I can trust completely", "There are enough people I feel close to"; possible answers: yes = 0, more or less = 1, no = 1).

The scores of these scales were evaluated both as continuous (score range from 3 to 9 for UCLA, from 0 to 6 for DJGT) and as dichotomous variable (presence of loneliness defined as UCLA score >3 or DJGT score ≥ 2 , as previously reported) [17,18].

The Cronbach's Alpha for the DJGT and the UCLA loneliness scales was 0.732 and 0.804, respectively.

Other evaluations included:

- *cognitive status*, assessed using SPMSQ [12];
- *global functional status* before hospitalization, investigated by evaluating the level of independence in basic activities of daily living (BADL) [19] and instrumental activities of daily living (IADL) [20];
- presence of *depressive symptoms*, assessed using the 5-item version of the Geriatric Depression Scale (GDS) [21];
- *comorbidity*, assessed with the Charlson Comorbidity Index [22];
- number of *medications* taken before hospitalization.

During the post-discharge follow-up, patients were reassessed after 1 month and after 6 months by: 1. Telephone call to the patient him/herself or to his/her relatives or caregivers when necessary; 2. Online computerized program: this allows to control for possible patient's hospitalization in the same hospital or in other nearby hospitals. The two outcomes considered were: 1–6 month overall mortality and all cause rehospitalization.

2.3. Statistical analysis

Continuous variables with normal distribution were expressed as means and standard deviations (SD) and compared by the t-test. Not-normally distributed continuous variables were expressed as medians and Interquartile Ranges (IQR) and compared using the Kruskal–Wallis test. Categorical variables were expressed as percentages and compared using the χ^2 .

We then evaluated the correlation (Spearman) between the UCLA and DJGT scales (and their sub-items) and the variables considered in the study (cognitive and functional status, comorbidity, therapy). The variables found to be significantly associated with UCLA or DJGT by univariate analysis or clinically relevant (age, sex, SPMSQ, GDS, Charlson, number of drugs, BADLs and IADLs scores) were subsequently included into multiple linear regressions.

The possible association between the endpoints (death or rehospitalization) during the 6-months follow-up and UCLA or DJGT scales or their single sub-items was assessed by stepwise backward multivariable logistic regression, adjusting for potential confounders (age, sex, SPMSQ, GDS, Charlson, BADLs and IADLs scores, and hospital location). The statistical analysis was conducted with the SPSS 13 statistical program.

3. Results

3.1. Cross sectional data

The principal characteristics of study population are reported in Table 1. The sample consisted of 300 older adults, mean age 82 years, with a slight majority of females (55%), mostly married (49%) or widowed (42%). From a multidimensional point of view, the subjects presented a

Table 1

Main characteristics of study participants (n. 300) according to the presence or absence of loneliness by the UCLA and DJGT scales.

	Whole sample	UCLA SCALE			DJGT SCALE		
		UCLA = 3 (n = 111)	UCLA > 3 (n = 189)	p	DJGT < 2 (n = 121)	DJGT ≥ 2 (n = 179)	p
Age, years ^a	81.7 ± 6.9	81.6 ± 6.5	81.7 ± 7.1	0.41	81 ± 6.7	82.1 ± 7	0.15
Sex, F ^b	166 (55.3)	63 (56.8)	103 (54.5)	0.93	63 (52.1)	103 (57.5)	0.35
SPMSQ ^c	1 (0–2)	1 (0–2)	1 (0–3)	0.02	1 (0–2)	1 (0–3)	0.09
GDS ^c	1 (1–2)	1 (0–1)	2 (1–3)	<0.001	1 (0–1.25)	2 (1–3)	<0.001
Charlson index ^c	3 (1–5)	3 (1–5)	3 (1–4)	0.76	3 (1–4)	2 (1–4)	0.18
N. of drugs ^a	8.2 ± 3.9	7.8 ± 3.8	8.5 ± 3.9	0.14	8 ± 3.9	8.4 ± 3.8	0.45
BADL ^c	6 (5–6)	6 (5–6)	6 (5–6)	0.06	6 (4–6)	5 (3–6)	0.004
IADL ^c	6 (4–7)	6 (4–8)	5 (3–7)	0.004	6 (4–8)	5 (3–7)	0.01
Marital status ^b				0.37			0.22
-Married/coupled	147 (49)	60 (54.1)	87 (46)		67 (55.4)	80 (44.7)	
-Unmarried	17 (5.7)	6 (5.4)	11 (5.8)		5 (4.1)	12 (6.7)	
-Widowed	126 (42)	40 (36)	86 (45.5)		44 (36.4)	82 (45.8)	
-Divorced	10 (3.3)	5 (4.5)	5 (2.7)		5 (4.1)	5 (2.8)	
Living alone ^b	84 (28)	29 (26.1)	55 (29.1)	0.58	28 (23.1)	56 (31.3)	0.12

DJGT: De Jong Gierveld and Van Tilburg. SPMSQ: Short Portable Mental Status Questionnaire. GDS: Geriatric Depression Scale. BADL: basic activities of daily living. IADL: instrumental activities of daily living.

Statistically significant values are in bold.

^a mean ± SD.

^b n, %.

^c median, IQR.

good cognitive and functional performance; a high prevalence of depressive symptoms (GDS ≥ 2 in 46% of the sample) and polypharmacy (mean number of drugs 8.2) was observed. UCLA and DJGT scales positively and significantly correlated with each other (r: 0.49, p < 0.001).

A high prevalence of loneliness was observed, 63% with the UCLA scale (mean score 4.6) and 60% with the DJGT scale (mean score 2.0). Combining UCLA and DJGT, 48% of the sample tested positive for both scales, while 27% of the population was positive for only one of the two scales.

Subjects with “positive” UCLA scale (score >3) had a significantly higher prevalence of depressive symptoms, greater numbers of errors at SPMSQ, and lower autonomy in IADLs. Similarly, patients with “positive” DJGT scale (score ≥ 2) had a significantly higher prevalence of depressive symptoms, and higher disability in BADLs and IADLs.

At univariate analysis, the UCLA scale was significantly correlated with the GDS (r: 0.41, p < 0.001), the SPMSQ (r: 0.15, p = 0.012), and the BADLs (r: -0.21, p < 0.001) and IADLs (r: -0.23, p < 0.001) scores. The DJGT scale was significantly correlated with age (r: 0.12, p = 0.037), GDS (r: 0.44, p < 0.001), BADLs (r: -0.13, p = 0.021) and IADLs (r: -0.17, p = 0.003) scores.

In Table 2 and Table 3 are reported the results of multiple linear regression analysis for UCLA and DJGT scales. GDS (B coeff. 0.462, p < 0.001) and BADLs (B coeff. -0.209, p = 0.02) scores were independently associated with UCLA loneliness scale. Only the GDS

score was independently associated with the DJGT scale (B coeff. 0.512, p < 0.001).

3.2. Longitudinal data

During the first month of follow-up after discharge, we observed 17 deaths and 44 rehospitalizations, while during the 6 months of follow-up we observed 34 deaths and 77 rehospitalizations.

No significant difference was found in the distribution of rehospitalization and mortality according to UCLA e DJGT scales (see Supplementary Table S1). By multivariable logistic regression analysis we found no association between mortality at 1 and 6 months and UCLA total score, UCLA sub-items, DJGT total score, and living situation (living alone) (data not shown). We also found no significant associations between rehospitalization and UCLA and DJGT total score, and UCLA and DJGT sub-items (data not shown). Instead, multivariable logistic regression analysis revealed that mortality within 1 month was significantly associated with the Charlson Comorbidity Index (O.R. 1.31, 95% C.I. 1.08–1.58) and with the answer “no” or “sometimes” to the item 6 (“There are enough people I feel close to”) of the DJGT scale (O.R. 4.6, 95% C.I.: 1.63–12.91), but not with the cumulative score of DJGT items relating to social loneliness.

As regards mortality within 6 months from discharge, there were no significant differences in the main baseline characteristics between

Table 2

Multiple linear regression analysis for UCLA score and variables of interest assessed in the study.

	B Coeff.	SE	95% C.I. B	p
Sex	0.239	0.205	-0.17 – 0.64	0.25
Age	0.002	0.015	-0.03 – 0.03	0.89
SPMSQ	0.071	0.066	-0.06 – 0.20	0.28
GDS	0.462	0.076	0.31 – 0.61	<0.001
Charlson index	-0.027	0.041	-0.11 – 0.05	0.52
N. of drugs	0.017	0.025	-0.03 – 0.07	0.48
BADLs	-0.209	0.09	-0.39 – 0.03	0.02
IADLs	-0.004	0.062	-0.13 – 0.12	0.94

SE: standard error. 95% C.I.: 95% confidence interval. SPMSQ: Short Portable Mental Status Questionnaire. GDS: Geriatric Depression Scale. BADL: basic activities of daily living. IADL: instrumental activities of daily living.

Statistically significant values are in bold.

Table 3

Multiple linear regression analysis for DJGT score and variables of interest assessed in the study.

	B Coeff.	SE	95% C.I. B	p
Sex	0.100	0.185	-0.26 – 0.46	0.59
Age	0.004	0.013	-0.21 – 0.03	0.73
SPMSQ	-0.007	0.059	-0.12 – 0.11	0.90
GDS	0.512	0.069	0.38 – 0.65	<0.001
Charlson index	-0.054	0.037	-0.13 – 0.02	0.15
N. of drugs	0.010	0.022	-0.03 – 0.05	0.64
BADLs	-0.063	0.081	-0.22 – 0.10	0.44
IADLs	-0.042	0.056	-0.15 – 0.07	0.46

SE: standard error. 95% C.I.: 95% confidence interval. DJGT: De Jong Gierveld and Van Tilburg. SPMSQ: Short Portable Mental Status Questionnaire. GDS: Geriatric Depression Scale. BADL: basic activities of daily living. IADL: instrumental activities of daily living.

Statistically significant values are in bold.

survivors and deceased (see Supplementary Table S2). However, proceeding with a logistic regression analysis, we found again a significant association with the Charlson Comorbidity Index (O.R. 1.28, 95% C.I. 1.08–1.50) and the answer “no” or “sometimes” to item 6 of the DJGT scale (O.R. 4.38, 95% C.I. 1.83–10.47). Unlike 1-month mortality, in this case we also found a significant association with the cumulative score of the three DJGT items relating to social loneliness (O.R. 1.48, 95% C.I. 1.05–2.08).

4. Discussion

4.1. Cross sectional analysis

Our study demonstrated a high prevalence of loneliness in older patients admitted to three Italian acute Internal Medicine or Geriatric wards. We found that feeling of loneliness were reported by over half of the sample (63% of subjects by using the UCLA scale, and 60% by using the DJGT scale). These data, despite being obtained from hospitalized patients, were collected within the first 24–48 hours after hospitalization; thus, the prevalence of loneliness might be influenced not only by the acute disease condition, but also by the pre-existing social and emotional situation. Moreover, subjects with delirium and severe cognitive impairment were excluded, as they would have been unable to complete standard loneliness questionnaire. As it is known that loneliness is associated with cognitive impairment [23] and disability, it is reasonable to speculate that the present data may represent an underestimate of loneliness among real-world older medical inpatients. This estimated prevalence is thus consistent with the higher values recorded in the few available studies conducted in older adults. A study on 103 Spanish hospitalized older adults found a prevalence of moderate-severe loneliness of about 63% [9]; similarly, a study on 107 Irish geriatric inpatients found that over half of them (55%) reported moderate-high loneliness [24]. Conversely, Just et al. reported lower levels of severe loneliness (37%) by analysing one hundred German inpatients; however, the sample also included psychiatric patients and adults subjects (age range between 52 to 93 years) [8]. High prevalence of loneliness was found also in young inpatients, with a prevalence of 55% in hospitalized subjects of about 40 years of age [25]. Our study expands these few previous findings, analysing a much larger sample of hospitalized older patients, and evaluating also post-discharge outcomes (mortality and rehospitalization).

By analysing the possible correlations with the variables of interest, we found that loneliness scales correlated positively with the presence of depressive symptoms and with lower functional autonomy, independent of possible confounders. The correlation between depressive symptoms and loneliness is in line with current literature. In fact, it has been shown that higher levels of loneliness are associated with greater depressive symptoms, regardless of socio-demographic characteristics, level of education, income, marital status, social support, and perceived stress [26]. Moreover, subjects with feelings of loneliness seem to present, compared to those “not lonely”, higher levels of anxiety, anger, depressed mood and lower optimism, emotional stability, and social skills [27]. The mutual relationship between depression and loneliness has been shown by longitudinal studies in the general population, suggesting that depression represents a possible antecedent of loneliness and vice versa [28]. In fact the loneliness-depressive symptoms relationship could be bidirectional and cause a vicious circle: on one hand, a subject who feels alone and unsatisfied by relationships could develop feelings of sadness, anger and anguish, on the other hand, the depressed person often presents behaviours (e.g. social withdrawal) predisposing to isolation and distancing from the society. The present data support the association previously observed among multimorbid inpatients with COVID-19, showing that lower self-efficacy mediates this association [29]. This suggests that psychoeducational interventions aimed at increasing perceived social support may reduce depressive symptoms in

multimorbid subjects with acute disease. Finally, it is noteworthy that functional status (BADL), rather than comorbidity burden (CCI), appears to be associated with loneliness, highlighting the importance of shifting the paradigm from a disease-centered model to a function-centered one, which is more representative of the real needs of older patients.

4.2. Longitudinal analysis

The two validated measures of loneliness adopted in the present study did not show a significant association with 1- and 6-month mortality. As far as we know, this is the first study to assess post-discharge mortality risk among inpatients. The lack of association observed is somehow at odds with long term cohort studies that have observed an association between loneliness and mortality among community-dwelling subjects, although with heterogeneity among studies [30].

It is conceivable that, due to the short-term follow-up, and the selection of older adults with complex clinical conditions, the prognostic weight of somatic diseases might be more important in the present sample. In fact, we found a significant association between mortality and higher Charlson Comorbidity index scores. This was expected, since this index has been validated precisely to predict life expectancy of a subjects in clinical settings, based on their comorbidity burden [22].

Yet, among single items of loneliness scales, answering “no” or “sometimes” to item 6 of the DJGT scale (“*There are enough people I feel close to*”) was associated with a more than 4-fold increase in the risk of death 1 and 6 months after discharge, independently of several confounding factors.

We speculate that, in our older patients hospitalized for acute intercurrent pathologies, “social” loneliness, and not emotional loneliness, is able to predict mortality. Different hypotheses can be made regarding the association between the feeling that you do not have a sufficient number of people close and mortality risk. First, it is possible that loneliness reflects a structural lack of social network size and support which, according to some studies, has a major negative impact on mortality risk of older adults [31], with an effect conceivably stronger after a “traumatic” event such as a hospitalization for an acute intercurrent disease.

Moreover, it has been hypothesized that the perception of few significant close people is associated with several functional consequences, including a less healthy lifestyle, a less positive psychological attitude (e.g. lower self-efficacy), and negative physiological effects [32]. Regarding the last point, it is possible that the “organic” correlates of low social integration might influence the short-term outcome of discharged patients by affecting the course of multimorbidity in the short term. For example, it has been reported that leukocytes of subjects with feelings of loneliness show a greater pro-inflammatory activity and a lower protective activity against infectious agents [33]. Furthermore, other studies have demonstrated how loneliness activates neuroendocrine stress mechanisms, in particular the hypothalamic-pituitary-adrenal axis (which in turn influences various physiological effects, including glucose metabolism, inflammation, cardiovascular activity, immunity, neurodegeneration) with increase circulating levels of catecholamines [34].

The main limitation of the study may be represented by the “subjectivity” of the loneliness feeling, which however is common to every research on this topic, since loneliness is indeed a subjective feeling. We also did not measure the number of persons on whom the patients could rely on, knowing however whether the patient lives alone or with someone; this factor has been associated with reduced mortality in hospitalized older patients [35], and might also influence post-discharge mortality. Moreover, given the association between loneliness and depressive symptoms, a limitation of the study is the lack of data on the use of antidepressant drugs that could potentially impact loneliness. Finally, we cannot exclude the influence of factors that were not taken into consideration into the study.

5. Conclusions

In conclusion, ours is one of the few studies analysing the prevalence of loneliness and potentially related factors in older hospitalized adults. We found that loneliness is a widespread phenomenon in this clinical setting and is strictly associated with depressive symptoms and disability status.

While validated loneliness scales were not associated with prognosis, particular aspects of loneliness, namely the feeling of scarce social ties, were linked to higher 1- and 6-month mortality rates, suggesting that specific loneliness assessments might provide short-term prognostic value in the context of acute medical ward.

We recommend a greater attention and awareness of the "loneliness" phenomenon also in the acute clinical setting, in order to identify effective strategies to detect the issue, to fight social disconnection, and, potentially, to reduce its negative outcomes.

CRedit authorship contribution statement

Gloria Brombo: Investigation, Data Curation, Formal analysis, Supervision, Writing – original draft

Paola Guindani, Dario Pedrini, Giovanni Lorenzo Squintani, Barbara Carrieri, Massimiliano Fedecostante, Giuseppina Dell'Aquila, Flaminia Lucchini: Investigation, Resources, Data Curation, Writing – review & editing

Andrea Ungar: Conceptualization, Supervision, Writing – review & editing

Enrico Mossello: Conceptualization, Methodology, Validation, Resources, Supervision, Writing – review & editing, Project administration.

Antonio Cherubini: Conceptualization, Methodology, Validation, Resources, Supervision, Writing – review & editing, Project administration.

Giovanni Zuliani: Conceptualization, Methodology, Validation, Formal analysis, Resources, Supervision, Writing – original draft, Project administration.

Declaration of Generative AI and AI-assisted technologies in the writing process

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The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:<https://doi.org/10.1016/j.jnha.2025.100642>.

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