

Original Article

Acute hospital admissions among elderly patients in Danish general practice

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ABSTRACT

INTRODUCTION. The rising number of acute hospital admissions among elderly patients exerts substantial pressure on the healthcare system, and many of these admissions could potentially be prevented. This pilot study aimed to explore patterns in the frequency and duration of acute hospitalisations in elderly patients (≥ 65 years).

METHODS. A retrospective chart review was conducted in a solo general practice in Aarhus, Denmark, examining acute hospital admissions among elderly patients from 1 November 2022 to 1 November 2024. Data were extracted on 11 November 2024. The review identified 44 patients with a total of 70 admissions. The study explored associations between selected characteristics and short-term versus longer acute hospital admissions. For comparison, data drawn from a larger practice included 195 patients and 322 admissions.

RESULTS. Nearly half of all acute admissions lasted one day or less, with 30% concluding in discharge from an emergency department. Language barriers were associated with longer stays, whereas no other examined characteristics showed significant associations. Diagnosis was often recorded using broad ICD-10 categories, particularly for short stays.

CONCLUSIONS. Short-term admissions in elderly patients are common, yet difficult to predict. Many may stem from clinical uncertainty or system constraints. Larger practice-based studies are needed to better understand and address avoidable admissions in this vulnerable population.

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Modern medicine continues to improve population health and life expectancy [1]. While this is fundamentally a positive trend, it challenges healthcare systems facing both a rapidly growing elderly population [2] and persistent staff shortages [3].

General practitioners (GPs) manage an expanding number of elderly patients with complex multimorbidity and collaborate closely with municipal services and out-of-hours medical providers to avoid unnecessary hospital admissions [4, 5]. Despite these efforts, the number of emergency calls (1-1-2) and acute hospitalisations among elderly adults has risen. Many of these admissions are brief and occur in emergency departments, where they often yield limited clinical benefit while consuming substantial healthcare resources [6, 7].

Hospital staff frequently view such short-term admissions as potentially preventable [6], whereas GPs express concern that frail older patients may be discharged too early or without adequate follow-up, increasing the risk of readmissions [8]. In Denmark, post-discharge follow-up is standardised by colour coding, indicating the timing required after discharge: green indicates routine follow-up in which the patient is responsible for

contacting their GP. Yellow indicates vulnerable patients requiring active follow-up arranged by the GP, and red indicates a need for follow-up within 1-2 working days.

Acute hospital stays also carry risks specific to elderly adults, including delirium, functional decline and hospital-acquired infections [6, 8, 9]. Reducing unnecessary admissions is therefore essential both for improving patient outcomes and maintaining system capacity.

In Denmark, GPs serve as gatekeepers to secondary care; acute hospital admission typically requires referral from the patient's GP, an out-of-hours GP or the emergency medical dispatch centre (1-1-2) [10]. Understanding transitions between primary and secondary care is therefore important when examining acute hospitalisations among elderly adults.

This quality development project aimed to investigate factors that may influence acute hospitalisations among elderly adults and to identify initial trends that may guide the design of larger, more comprehensive studies using the same methodological approach.

Methods

Data collection was conducted at a solo general practice in Aarhus, Denmark, using the clinic's electronic health record system (XMO). The first author was employed at the practice and therefore had authorised access to the records used for anonymised data extraction.

On 11 November 2024, a search identified 252 patients aged ≥ 65 years in the solo practice. Among these, 59 had at least one acute hospital admission during the period from 1 November 2022 to 1 November 2024.

Exclusions included death ($n = 3$), change of GP ($n = 1$), elective surgical admissions ($n = 8$) and acute care team contacts without admissions ($n = 3$).

The final study sample comprised 44 patients.

Data were recorded using an audit form and included the following variables:

1. ID number, gender and age
2. Type of referring service: daytime GP; locum GP (temporary substitute during absence of the regular GP); out-of-hours doctor; 1-1-2 emergency call; open admission; 24-hour care responsibility (discharging department remains responsible for re-admissions within 24 hours); other; and unknown. When the referring service could not be identified, the patient was briefly contacted to determine who initiated the admission. No additional information was collected.
3. Living situation (categorised as: living alone; living with a partner or family member; senior housing; or care facility)
4. Whether the patient received municipal home assistance
5. Whether admissions were acute or elective
6. Number of days in hospital and ICD-10 diagnosis codes. For each admission, the primary hospital diagnosis (A diagnosis) was recorded. Length of stay was measured in calendar days as recorded in the discharge summaries. To improve table readability, diagnoses were grouped into broader organ-system categories based on ICD-10 chapters
7. Discharging department

8. Follow-up request (categorised as: none, green, yellow or red)
9. Language barrier (interpreter used or language difficulties noted)
10. Number of in-person GP visits over two years
11. Number of acute and elective hospitalisations.

Sociodemographic data were extracted directly from the GP chart, clinical data from hospital discharge summaries and healthcare utilisation data from the GP system's consultation and hospitalisation overview.

The variables were selected based on clinical relevance and author consensus, reflecting factors commonly considered in GP assessment of acutely ill older patients.

Some patients had more than one hospitalisation during the two-year period. All included events were acute admissions, and each admission was analysed as a separate event. Patient-level characteristics (e.g., age, gender and living situation) were linked to each admission, but no separate comparison was made between patients with and without repeated admissions, as this was beyond the scope of the pilot design.

All statistical analyses were performed in Excel. Descriptive statistics were calculated for all variables. Logistic regression was used to assess whether age, gender, referring party, home assistance, language barrier, frequency of GP visits, living situation or follow-up request predicted the likelihood of short (≤ 1 day) versus long admissions. Independent-sample t-tests were used to compare mean admission length across subgroups, with admission length as the outcome. ICD-10 diagnoses were grouped by chapter to explore patterns related to length of stay.

To assess generalisability, comparison data were collected from an urban GP clinic in Aarhus with four medical capacities. Data extraction was conducted in collaboration with authorised personnel at the urban practice, ensuring compliance with local data protection regulations. Using the same inclusion/exclusion criteria, a search performed on 8 January 2025 yielded 267 patients aged ≥ 65 years with hospital discharge summaries dated between 1 November 2022 and 1 November 2024.

The exclusion criteria were death ($n = 1$), change of GP ($n = 2$), elective surgical admissions ($n = 61$) and acute care team contacts without admission ($n = 8$).

The final cohort comprised 195 patients.

Due to restricted access to individual patient records, only a limited subset of variables could be extracted: age and gender ($n = 1$), admission type ($n = 5$), length of stay and primary diagnosis ($n = 6$) and number of hospital admissions ($n = 11$). These data were obtained from the clinic's aggregated discharge overview covering the two-year study period.

The urban cohort was therefore used to examine whether key trends identified in the solo-practice cohort, particularly diagnosis patterns and admissions duration, were also present in the larger practice population. This comparison was intended to support the exploratory, hypothesis-generating aims of this pilot study rather than replicate the full analysis. Comparisons between the two cohorts were descriptive only, and no statistical testing was performed.

Trail registration: not relevant.

Results

The study included 44 patients, with an average age of 77. Eleven patients (18%) had a registered language

barrier. Most (57%) lived with a partner or a family member, and the majority (64%) received no home assistance. Across the group, 714 in-person GP consultations were recorded in the two-year period. A total of 70 acute hospital admissions were recorded among the 44 patients, and 15 patients (34%) experienced more than one admission. These patients accounted for 17% of the total elderly population at the clinic.

Table 1 summarises the distribution of admission duration, referring party and diagnostic categories for both the solo and urban practices. Nearly half of all admissions lasted a day or less, with many lasting less than 24 hours. A similar pattern was observed in the urban practice. Diagnosis codes were grouped by ICD-10 chapters; circulatory conditions were the most frequent diagnoses in both cohorts.

TABLE 1 Characteristics of acute hospital admissions in a solo general practitioner (GP) practice and an urban GP practice.

	Admissions, n (%)	
	solo practice (N _s = 70)	urban practice (N _u = 322)
<i>Length of stay</i>		
Generally:		
0-1 days	34 (49)	144 (45)
2-3 days	14 (20)	71 (22)
4-6 days	13 (19)	48 (15)
7-10 days	4 (6)	39 (12)
> 10 days	4 (6)	20 (6)
≤ 24 h:		
0-5 hrs	8 (24)	-
6-10 hrs	5 (15)	-
11-15 hrs	5 (15)	-
16-20 hrs	6 (18)	-
21-23 hrs	3 (9)	-
24 hrs ^a	7 (19)	-
<i>Diagnostic categories: ICD-10</i>		
Circulatory system	8 (11)	47 (24)
Symptoms & abnormal findings	6 (9)	38 (19)
Injury/poisoning/external causes	5 (7)	32 (16)
Digestive system	5 (7)	35 (18)
Musculoskeletal system	4 (6)	- ^b
<i>Referring party: admitter</i>		
Own GP	26 (37)	-
Out-of-hours GP	24 (34)	-
1-1-2 emergency call	9 (13)	-
Other	3 (4)	-
Unknown	3 (4)	-
Open admission	2 (3)	-
24-h care responsibility	2 (3)	-
Locum GP	1 (1)	-

a) If admission exceeded 24 h by ≤ 4 h, it was rounded down to 1 day.

b) The musculoskeletal system was not among the top five diagnostic categories in the urban practice; the fifth most common was respiratory system (26 admissions, 13%).

Admission source data were available in 76% of charts. For the remaining cases, a brief phone call was attempted to identify the referring party; in some cases, this was confirmed, while in others it remained unknown. Most admissions originated either from the patient's own GP, out-of-hours doctors, or 1-1-2 calls (Table 1). Patients were discharged from a total of 20 departments, with 30% being from the Emergency Department at Aarhus University Hospital.

Post-discharge follow-up was absent in 56% of cases; 43% received a green-level follow-up, 1% required red-level follow-up and none received yellow-level requests.

From the larger urban GP practice, 195 eligible patients were identified, and 322 acute hospital admissions were recorded; 67 patients (34%) experienced multiple admissions. As shown in Table 1, the distribution of admission length and diagnostic categories closely mirrored the solo practice findings.

Independent t-tests showed no statistically significant predictors of hospital stay duration, except for language barriers: patients with a language barrier had longer stays (3.6 versus 1.5 days, $p = 0.010$). Older patients tended to stay longer (5.0 versus 2.2 days, $p = 0.051$) (Table 2). Logistic regression found no significant predictors of short stays (≤ 1 day), though trends suggested lower odds for men, older patients and those with language barriers; all confidence intervals included 1 (Table 3). No significant association was found between ICD-10 chapters and admission length ($p = 0.135$), though "symptoms & abnormal findings" were mostly linked to short stays.

TABLE 2 Mean hospital stay duration by patient characteristics in the solo practice cohort.

	Mean stay, days	p value ^a
<i>Gender</i>		0.306
Female	2.67	
Male	3.9	
<i>Age</i>		0.051
Younger (\leq median)	2.17	
Older ($>$ median)	5.03	
<i>Home assistance</i>		0.965
No assistance	3.42	
Assistance	3.36	
<i>Language barrier</i>		0.01 ^a
No barrier	1.5	
Language barrier	3.62	
<i>Follow-up request</i>		0.524
No follow-up	3.87	
Follow-up request	3.0	

a) $p < 0.05$ was considered statistically significant.

TABLE 3 Factors associated with short hospital stays (≤ 1 calendar day) in the solo-practice cohort (N = 70).

	β -coefficient	OR ^a (95% CI)	p value
Gender	-0.487	0.614 (0.21; 1.76)	0.357
Age	-0.029	0.972 (0.91; 1.03)	0.358
Admitter	0.136	1.15 (0.78; 1.68)	0.533
Home assistance	-0.677	0.51 (0.16; 1.577)	0.239
No. of doctor visits	-0.009	0.991 (0.95; 1.03)	0.426
Language barrier	-1.148	0.317 (0.03; 3.94)	0.216
Living alone	0.097	1.101 (0.37; 3.25)	0.861
Follow-up request	0.308	1.36 (0.48; 3.86)	0.563

a) OR (unadjusted logistic regression) with reference categories: female, ≤ 77 yrs of age, general practitioner as admitting physician, no home assistance, no language barrier, cohabiting, and no follow-up request. The number of doctor visits was included as a continuous variable and therefore has no reference category.

Discussion

Nearly half of all admissions in this study lasted less than 24 hours, and 30% concluded in the emergency department. Similar patterns have been described in Danish and international cohorts, in which short-stay hospitalisations among elderly adults are frequent [7, 9-12]. Studies from Denmark and abroad also show increasing numbers of brief admissions driven by rising multimorbidity, limited outpatient capacity and systemic pressure on emergency departments [8, 10, 11, 13]. The present findings, therefore, fit into a broader trend of short-term, often symptom-driven hospitalisations among elderly patients.

In our cohort, variables such as age, gender, living situation, home assistance and referral source showed trends but revealed no statistically significant association with admission duration. This is consistent with previous research suggesting that admissions decisions for elderly adults are multifactorial and often shaped by clinical uncertainty or concern about deterioration rather than by any single patient characteristic [12, 14-16]. Clinicians must make decisions under time pressure, with incomplete information and within a medicolegal framework that may favour risk-averse strategies [7]. Resource constraints in intermediate care, municipal services and home-based alternatives may further drive admissions that appear unnecessary on paper but are clinically appropriate in context [12, 17]. This aligns with defensive medicine, where patients are admitted due to perceived risk rather than clear clinical necessity.

This study has several limitations. Most importantly, the small sample size limits the study's statistical power and ability to identify predictors of short stays. The pilot design should therefore be emphasised: the aim was exploratory, focused on feasibility and identifying potential trends rather than establishing definitive predictors. The use of GP-level data is a strength, as such data provide a clinically grounded perspective often absent in register-based studies. However, GP records were collected for clinical purposes, not research, which may introduce variability in documentation, diagnosis coding and data completeness. Furthermore, the reliance on manual extraction increases the risk of minor classification inconsistencies despite careful review.

Overall, the study highlights recurrent patterns in short-term hospitalisations among elderly patients, including high rates of brief stays, symptom-based presentations and repeated admissions. These findings underline the need for larger practice-based studies that combine GP data with hospital records to better understand transition

pathways and identify where alternative care models, such as strengthened intermediate care, improved triage support or enhanced follow-up, may reduce unnecessary hospitalisations. Similar dynamics have been described in high-utilisation patient groups, where repeated short admissions often reflect unresolved medical or social complexity rather than discrete acute events [18].

Conclusions

This study examined selected factors that may influence acute hospital admissions among elderly patients in general practice and whether these patterns were consistent across two different practice settings. Nearly half of all admissions in both solo and urban practices lasted one day or less, indicating that short stays are a common feature of acute care for elderly patients.

Across the variables examined, only language barriers were associated with longer stays, whereas age, gender, living situation, home assistance and referring party showed no statistically significant associations. Thus, no clear patient-level predictors of short admissions could be identified. The close similarity between the two cohorts suggests that the observed patterns are not unique to a single practice type but may reflect broader trends in general practice.

Overall, our findings indicate that short admissions among elderly adults likely arise from a combination of clinical uncertainty and limited outpatient alternatives rather than distinct patient characteristics. This was a pilot study with a small sample size; larger practice-based investigations are needed to confirm these results and to better understand which organisational or clinical factors shape acute admission patterns among elderly patients.

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