Research Article

Re-Hospitalization of Elderly Patients in the Geriatrics Department of Hospital National Center of Fann

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Abstract

Background: The elderly, with their multiple co-morbidities and unfavourable geriatric conditions, are particularly at risk of re-hospitalisation. In sub-Saharan Africa, data are virtually non-existent.

Objectives: To determine the prevalence and factors associated with rehospitalisation in our context.

Methodology: This was a retrospective, descriptive and analytical study (1 August 2019-31 July 2020) including people aged 65 and over who were rehospitalised on an unscheduled basis in the geriatrics department of the CHU de Fann. In the analytical study, in order to identify risk factors, we compared patients who had been rehospitalised with those who had not.

Results: Of 242 patients hospitalised during this period, 40 had an unscheduled rehospitalisation, giving a 6-month prevalence rate of 17.3%. The average age was 78 years, with a predominance of men (52.5%). Most of our patients came from the hospital emergency department (57.5%). Arterial hypertension was the most common comorbidity (72.5%), followed by arthritis (34.15%) and heart disease (27.5%). Reasons for re-hospitalisation were dominated by deterioration in general condition (90% of patients), acute mental confusion (37.5%), acute respiratory distress (20%) and refusal to eat (20%). Geriatric syndromes were dominated by loss of autonomy (77.5%), malnutrition (40%), mental confusion (37.5%) and cognitive disorders (37.5%).

Cardiovascular diseases (32.5%), infectious diseases (21.6%) and tumours (21.6%) were the most common.

Re-hospitalisation was found to be significantly associated (p<0.05) with cardiac decompensation (OR: 3.16), the existence of an active Cancer (OR: 4.45), iatrogenicity (OR: 3.15), mental confusion (OR: 2.38) and major neurocognitive disorders (OR: 2.17).

Conclusion: This study enabled us to determine the prevalence and factors associated with re-hospitalisation in our context. Prevention should focus on early management of these factors.

Keywords: Dakar; Elderly; Re-hospitalisation

Introduction

The ageing of the population is a major political issue, since the proportion and absolute number of elderly people are increasing significantly throughout the world. According to projections, the world's geriatric population will increase from around 962 million (13%) in 2017 to 1.4 billion (19.5%) in 2030, and will double

by 2050 [1,2]. This phenomenon is expected to accelerate in developing countries, particularly in sub-Saharan Africa [3]. This demographic transition is accompanied by an epidemiological transition with the persistence of infectious diseases and the preponderance of chronic diseases and geriatric syndromes often responsible for one or more hospitalisations [4].

Re-hospitalisation is defined as an unexpected admission within a shorter or longer period of discharge. It is common throughout the world, with a prevalence varying between 11.6-17.5% [5,6]. Re-hospitalisation is associated with serious consequences, with mortality estimated at 18.9% [7] and a heavy economic burden, with an estimated annual cost of 17.4 billion dollars in 2009 in the United States [8]. In Africa, despite the extent of ageing, there are virtually no data on re-hospitalisation of the elderly.

In Senegal, the first university geriatric service began inpatient activities in 2015. A few studies have already assessed hospitalisations and mortality in the department [9]. This study completes the study of the characteristics of elderly patients hospitalised in our setting. It aims to study the prevalence or frequency of re-hospitalisation of these patients and to determine the factors associated with this re-hospitalisation. The aim was therefore to determine the prevalence and factors associated with re-hospitalisation and, secondarily, to describe their socio-demographic and diagnostic characteristics.

Materials and Methods

Our study took place in the geriatrics department of the FANN national university centre. This hospital is a reference structure at the top of the health pyramid. It is an ideal setting for a multidisciplinary speciality such as geriatrics, allowing perfect collaboration with other medical specialities (neurology, psychiatry, infectious diseases, pneumology, cardiology, emergency, physical medicine, etc.). The geriatrics department was created in 2015, temporarily housed in the building allocated to the emergency department. At the time, its activities were limited to outpatient consultations. Since August 2019, the department has had its own premises adapted to the care of the elderly. It has a capacity of 8 beds for geriatric short-stay hospitalisation (2 individual rooms and 3 rooms with 2 beds each) combined with an outpatient and day hospitalisation unit with 3 beds. The department also has a Mobile Geriatric Unit with 2 sub-units: inpatient and outpatient,

responsible respectively for elderly patients admitted to other medical and surgical departments and for home visits to elderly patients with reduced mobility.

This was a retrospective, descriptive and analytical study over a 2-year period from 1 August 2019 to 31 July 2021 on a population aged 65 and over, hospitalised in the geriatrics department of the FANN University Hospital.

Sampling diagram
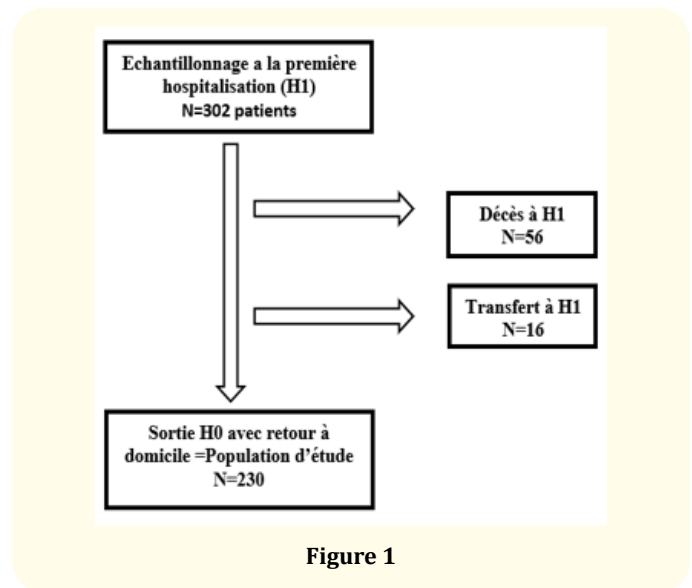
Figure 1

All patients aged 65 and over hospitalised during the study period were included. Patients who died or were transferred to another department at the time of their first hospitalisation were excluded, as were day case re-hospitalisations and incomplete records.

During the study period, we considered patients who had been rehospitalised unplanned within 6 months of discharge. The sociodemographic characteristics, comorbidities and medical history, clinical aspects (reasons for hospitalisation, diagnosis and associated geriatric syndromes) at the time of the first hospitalisation were recorded for these patients. The data collected were entered and analysed using Epi-info version 7 software. In the descriptive study, we determined the prevalence of re-hospitalisation. Re-hospitalisation was defined as early when it occurred within 30 days, intermediate when it occurred between

the 2nd and 3rd month and late when it occurred between the 4th and 6th month. Qualitative variables were expressed as numbers and percentages, and quantitative variables as the mean with its standard deviation, as well as the median and extremes.

In the analytical study, data from the first hospitalisation of patients who had been rehospitalised were compared with those who had not been rehospitalised, in search of factors associated with rehospitalisation. Cross-tabulations were performed according to epidemiological, clinical (geriatric syndromes) and diagnostic characteristics. Qualitative variables were analysed using the Chi-square test or Fisher's exact test for numbers less than 5. A p value < 0.05 was considered significant.

Results

Epidemiological characteristics

During the study period, 230 patients were admitted to hospital. Of these, 40 patients were readmitted within 6 months, 43% early, 33% semi-late and 25% late. The readmission rate was 7.39% in the first month (early or avoidable readmission), 13.04% at three months and 17.39% at six months. The frequency of semi-late re-hospitalisation (2 and 3 months) was estimated at 6.65% and late re-hospitalisation (between 4 and 6 months) at 4.35%.

The average age of the patients was 78+/-9 years, with extremes of 65 and 96 years. The 80-84 and 75-79 age groups were more representative, with 27.5% and 25% respectively. There was a slight male predominance (52.5%), with a M/F sex ratio of 1.1. Most of our patients (57.5%) came from the hospital emergency department and 27.5% were admitted directly following a consultation in the department. Most of our patients (45%) were without partners (widowed, divorced) (Table 1).

Variables	Terms	Number /40 (%)
	65-69	8 (20)
Age group	70-74	3 (7,5)
	75-79	10 (25)
	80-84	11 (27,5)
	85-89	5 (12,5)
	90-94	2 (5)
	Over 95	1 (2,5)
Sex	Male	21 (52,5)
	Female	19 (47,5)

Marital status	Widowed	16 (40)
	Married	15 (37,5)
	Divorced	2 (5)
Type of admission	hospital emergency department	23 (57,5)
	Following consultation service	11 (27,5)
	referral to other services	6 (15)

Table 1: Sociodemographic characteristics.

Clinical characteristics

Past history was dominated by ischaemic stroke (32.5%) and repeated falls (27.5%). Ten percent had been hospitalised within the previous 6 months. On average, patients had three chronic conditions. Polypathology with at least 3 comorbidities was found in 75% of patients. The most common co-morbidity was arterial hypertension (72.5%), followed by arthritis (34.15%), heart disease (27.5%) and diabetes (25%). Polymedication, with more than 5 drugs taken regularly, concerned 20% of patients.

Ninety-five per cent lived with their family, 82.5% were frail, 25% had a chronic loss of autonomy and 65% had a family or professional carer. All our patients had a carer, 57.5% of whom were family members and 35% professional carers (Table 2).

	Terms	Number/40(%)
History	Ischaemic stroke	13 (32,5)
	Repeated falls	11 (27,5)
	COVID pneumonia	5 (12,5)
	Previous hospitalisation over 6 months	4 (10)
	VTE	4 (10)
	Pulmonary tuberculosis	1 (2,5)
Comorbidities	Hypertension	29 (72,5)
	Osteoarthritis	14 (34,15)
	Heart disease	11 (25,5)
	Type 2 diabetes	10 (25)
	Arterial disease	7 (17,5)
	Prostate diseases	7 (17,5)
	Known cognitive disorders	5 (12,5)
	Known cancer	4 (10)

	Chronic bronchopneumonia	3 (7,5)	
	Chronic kidney disease	1 (2,5)	
number of comorbidities	1 comorbiditie	2 (5)	
	2 comorbidities	8 (20)	
	3 comorbidities	20 (75)	
Polymediction	5 drugs or more	8 (20)	
Lifestyle	Social isolation	2 (5)	
	Fragility	33 (82,5)	
	Loss of independence	10 (25)	
	Family carer alone	23 (57,5)	
	Family and professional carer	14 (35)	
	Professional carer alone	3 (7,5)	

Table 2: History and Comorbidities.

Clinical manifestations

Reasons for hospitalisation were dominated by deterioration in general condition in 90% of patients, acute mental confusion in 37.5%, refusal to eat in 20% and respiratory distress in 20%.

The diagnoses at the time of first hospitalisation were essentially cardiovascular (32.5%), infectious (21.6%), tumour (21.6%) and neurological (10.8%). The most frequent diagnoses were decompensation of congestive heart failure (25%), infectious pneumonitis (17.5%) and ischaemic stroke (10%). Unexplained anaemia accounted for 7.5% (Table 2). The most common geriatric syndromes were loss of autonomy (77.5%), malnutrition (40%), mental confusion (37.5%), major neurocognitive disorders (37.5%) and complications of immobilisation (32.5%). Depression was also found in smaller proportions (20%) and iatrogenic or adverse drug reactions (15%), with cardiovascular drugs, including diuretics (5%) and anticoagulants (5%) playing a major role (Table 3).

Analytical study

Five factors were found to be significantly associated with re-admission to hospital within 6 months (p < 0.05): two organ diagnoses and three geriatric syndromes:

	Rehospitalised N = 40 N(%)	Not rehospitalised N = 190;	P
1- Reasons for hospitalisation			
Impairment of general condition	36 (90)	175	NS
Mental confusion	15 (37,5)	56	NS
Respiratory distress	8 (20)	34	NS
Refusal to eat	8 (20)	35	NS
Fever	3 (7,5)	15	NS
Behavioural problems	3 (7,5)	17	NS
Acute motor deficit	2 (5)	8	NS
Disabling lumbago	2 (5)	9	NS
Digestive haemorrhage	1 (2,5)	4	NS
2- Geriatric syndromes			
Loss of independence	31 (77,5)	143	NS
Malnutrition	16 (40)	98	NS
Confusional syndrome	20 (37,5)	56	0,016
Major cognitive disorders	15 (37,5)	41	0,0424
Drug addiction	6 (15)	10	0,039
Immobilisation syndrome	13 (32,5)	68	NS
Depression	10 (25)	43	0,00388
3- Diagnostics			
Cardiovascular	12 (32,5)		
Cardiac decompensation ICG	10 (25)	18	0,0135
DVT diseases)	1 (2,5)	10	NS
Arterial disease	1 (2,5)	10	NS
Infectious	8 (21,6)	42	NS
Infectious lung disease	7 (17,5)	34	NS
Bacterial dermohypodermatitis	1 (2,5)	5	NS
Tumour	8 (21,6)		
Active cancer	8	10	0,0049
Neurological	4 (10,8)		
Ischaemic stroke	4 (10)	10	NS
Other	5 (13,5)		
Unexplained anaemia	3 (7,5)	8	NS
Chronic bronchitis	2 (5)	10	NS
Non-operable herniated disc	1 (2,5)	6	NS

Table 3: Clinical characteristics.

- Decompensation of congestive heart failure (p = 0.013); OR 3.16; CI [1.18-8.09].

- Progressive cancer (p = 0.004); OR 4.45; CI [1.41-13.66].

- Presence of iatrogenic disorders (p 0.039); OR 3.15; CI [0.88-10.35].

- Presence of major neurocognitive disorder (p 0.042); OR 2.17; CI [0.97- 4.75].

- Presence of mental confusion (p 0.016); OR 2.38; CI [1.12-5.07].

Discussion

This study highlighted the frequency of rehospitalisation in our setting and the associated aetiological factors. However, it has a number of limitations related to information bias, inherent in the retrospective collection method with missing data.

Epidemiologically, early re-hospitalisation was estimated at 7.39% in our patients and accounted for almost half (43%) of all re-hospitalisations. The rate of early or avoidable re-hospitalisation remains the most frequent of all re-hospitalisations described in the literature. A large European study [10] found that 50% of re-hospitalisations in the elderly were early and avoidable. This finding was confirmed by another Danish study of a geriatric population aged at least 75. William., et al. [11] in England found a slightly lower frequency of 6% than our own. Rates of early re-hospitalisation generally appear to be higher than in our series. A large American study [12] of Medicare and Medicaid beneficiaries found a rate of 9.24%. In Belgium, Cornette., et al. [13] found a rate of 10.7% in a geriatric population, while in France in 2008, Lanièce., et al. [14] found a higher rate of 14.2% in a population aged 75 and over.

The rate of rehospitalisation at the third month was estimated at 13.04%. Our data are similar to those of Zanochi., et al. [15], who in 2009 found a rate of 12.8% in an Italian geriatric population of 839 patients. However, re-hospitalisation rates at 3 months remain higher overall in the literature. In France, Gérard and Lorris [16,17] found a rate of 19.6% in 2019, while in Switzerland Maurer., et al. [18] found a rate of 20% in a pilot study of patients recruited from internal medicine departments.

The frequency of overall re-hospitalisation within 6 months was estimated at 17.3% in our series. This rate is close to that found by Gérard and Loris [16] (16%) in a French geriatric unit. However, this rate appears to be much lower than most of the data found in developed countries. In Hong Kong, Kwok., et al. [19] found a rate of 37.8% in a geriatric population. The frequency of re-hospitalisation at 6 months was estimated at 39.7% by Helene., et al. [20] in France in 2012 in the over 75s, and 24% by Gooding and Jet [21] in an American geriatric population. The low overall readmission rate in our series can be explained by a combination of several factors specific to our context. A home care unit has been set up to ensure continuity of care for elderly patients at risk of readmission. As a result, a care plan is drawn up on discharge in consultation with the family. Added to this is the low capacity of our department (8 beds), and the often unfavourable socio-economic situation, which forces some families to refuse readmission to hospital, which is often more expensive than the first admission [22]. Because of the limited capacity of our department, some patients may be rehospitalised in other care structures, thus underestimating the rate of rehospitalisation. According to Gruneir., et al. [23], 73.4% of patients in general were rehospitalised in the same hospital as initially, while Lanièce., et al. [24] reported that around 22% of the population aged ≥75 years had rehospitalisations in another hospital centre after an initial hospital stay.

Our patients had an average age of 78+/- 9 years, 82.5% were frail on admission, 25% had chronic loss of autonomy and all patients had a family or professional carer. The advanced average age of our sample and the geriatric nature of our patients reflect the increasingly advanced level of ageing in Senegal. These data are in line with most of the data found in geriatric facilities [5,25].

There was a slight male predominance (52.5%). Most of our patients came from the hospital emergency department (57.5%). This can be explained by the organisational model of our hospital structure with a common emergency department. Most patients pass through this department, where an initial geriatric assessment is carried out by the in-house geriatric mobile unit before admission to the geriatric short-stay department. J. Pacolet., et al. [26] reported a prevalence of hospitalisation via the geriatric emergency department of 80%. Most of our patients (45%) had no partner (widowed, divorced). This highlights a degree of family isolation.

Polypathology with at least 3 comorbidities was found in 75% of patients. Ageing is a favourable time for the onset of chronic

pathologies. Arterial hypertension (72.5%) was the most common comorbidity, followed by arthrosic diseases (34.15%), heart disease (27.5%) and diabetes (25.0%). Silversman., *et al.* [27] also noted a high incidence of arterial hypertension (59.1%), which is one of the most common comorbidities with age. This high prevalence can be explained essentially by changes in lifestyle in a context of rapid urbanisation. Poly-medication was estimated at 20% of patients on first admission. In their series, Gautier., *et al.* [7,28] found a higher rate of 34.7%, while Roux., *et al.* [29] identified multiple medication in 68% of elderly patients readmitted early.

Reasons for hospitalisation were dominated by deterioration in general condition in 90% of patients, acute mental confusion in 37.5%, refusal to eat in 20% and respiratory distress in 20%.

The main diagnoses were cardiovascular 32.5%, infectious 21.6%, tumour 21.6% and neurological 10.8%. These results are in line with the literature, where decompensation of these chronic diseases appears to be related to the causes of admission and readmission to geriatric care [30,31]. In a study carried out in a geriatric unit, cardiovascular, genitourinary and respiratory pathologies were the main diagnoses selected [16]. Decompensation of congestive heart failure (25%), infectious lung disease (17.5%) and ischaemic stroke (10%) were the most frequently selected diagnoses. In 2016, in a Swedish geriatric cohort, the main diagnoses in patients readmitted at 10 days, 30 days and 3 months were heart disease (9.3%) and infectious lung disease (7.7%) [32].

Loss of functional autonomy (77.5%) and malnutrition (40%) were the most common geriatric syndromes. These syndromes are often associated, malnutrition being a source of frailty and loss of autonomy. Drame., *et al.* [33] highlighted this relationship, finding a 60.1% loss of functional autonomy in frail elderly patients suffering from malnutrition. Another survey of elderly American Medicare beneficiaries in hospital identified a loss of autonomy in 81.2% [34,35]. Numerous studies have shown the numerous deleterious effects of hospitalisation on the elderly, including functional decline in 30-60% of cases [34,36]. Mental confusion (37.5%), major neurocognitive disorders (37.5%) and complications of immobilisation (32.5%) were also frequently reported.

In the analytical study, five factors were found to be significantly associated with re-hospitalisation within 6 months (p < 0.05). In terms of organ diagnosis, these were cardiac decompensation and the existence of an active cancer. In terms of geriatric diagnosis, iatrogenicity, major neurocognitive disorders and mental confusion were present.

Decompensation of heart failure affected 25% of patients. It was significantly associated with readmission, with a risk factor of 3 (OR 3.16; CI [1.18-8.09]). Several authors have found this association. In 2015, the French health authority confirmed that acute heart failure is the leading cause of unplanned hospitalisation in the elderly population. In the United States, in a study of Medicare beneficiaries [37] assessing readmission factors, 24.8% of patients with heart failure were readmitted early and 35.2% were readmitted to hospital for the same reason. Krumholz., *et al.* [38,39] also noted an early readmission rate of 25% and 29% within 3 months for acute heart failure in an American geriatric population aged 70 and over. Narrain., *et al.* [40] also identified this as a factor in readmission at 6 months in elderly patients.

Tumour pathology is a frequent cause of re-hospitalisation and death in the elderly. In our series, tumours and infectious diseases were the second most frequent diagnoses, affecting 21.6% of patients. Active cancer was significantly associated with the risk of re-hospitalisation (p 0.004; OR 4.45; CI [1.41-13.66]). The existence of active cancer, especially in the advanced stages, is almost always found in the literature to be a predictive factor for re-hospitalisation. In the United States [41], a study evaluating readmissions of patients with advanced cancer found a 71% prevalence of readmission in the year following discharge, and 16% were readmitted at least 3 times. Roux., *et al.* [29] also found active cancer to be a significant predictive factor for early readmission in patients aged over 75. Similarly, Zanochi., *et al.* [15] in Italy also associated it with an increased risk of readmission [RR = 2.9* (1.2-7.5)] within 3 months. Burhenn., *et al.* [42] demonstrated that elderly cancer patients who had at least 2 abnormal laboratory results (haemoglobin, albumin, sodium and SGOT) at discharge were 3 times more likely to be readmitted within 30 days than those with ≤ 1 abnormal result. The frequency of readmission in our series could be explained by the advanced stage of most elderly cancer patients with the onset of geriatric syndromes, the absence of long-term palliative care and the inadequacy of oncology reception services.

The presence of iatrogenicity was associated with re-hospitalisation with a risk factor of 3 (OR 3.15; CI [0.88-10.35]). Iatrogenicity was found in 15% of patients, with cardiovascular drugs, including diuretics (5%), and anticoagulants (5%) being most involved. Cardiovascular, psychotropic and anti-infectious drugs are frequently implicated in iatrogenesis [43]. These data are consistent with our series, in which two-thirds of readmissions for iatrogenicity were due to cardiovascular drugs and anticoagulants. In the literature, 30 to 60% of adverse drug reactions are predictable and avoidable [44]. Their frequency in geriatric medicine could be explained by several factors, such as therapeutic error (wrong indication, failure to comply with contraindications, excessive dosage or overly prolonged treatment), poor compliance with treatment or inappropriate self-medication in multi-medicated, elderly and frail patients.

The presence of mental confusion with a multiple risk factor of 2 was also found (OR 2.38; CI [1.12-5.07]). Confusion was found in 37.5% of patients readmitted to hospital. This rate appears high compared with other series. Gerard., *et al*. [16] found a prevalence of 13.4% in a cohort of 2 French geriatric units. In the SAFES study, 19.2% of patients presented with acute mental confusion [24]. In the Italian cohort, a prevalence of 6% was found [15].

Major neurocognitive disorders (p 0.042); OR 2.17; CI [0.97-4.75] were also present in the same proportions as confusion (37.5%). Delorio., *et al*. [45] identified these as factors in early readmission. Zannochi., *et al*. [15] in an Italian geriatric cohort identified major neurocognitive disorders as a factor in readmission at 15 days, 1 month and 3 months.

Other factors such as age [15,22], sex [46], multiple pathology [8] and loss of autonomy [47] have been found to be associated with re-hospitalisation in the elderly.

Conclusion

The risk of hospitalisation, and above all re-hospitalisation, remains frequent and serious in elderly patients. In our series, the rate of re-hospitalisation was 7.39% at the first month, 13.04% at three months and 17.39% at six months. The frequency of semi-late re-hospitalisation (2 and 3 months) was estimated at 6.65% and late re-hospitalisation (between 4 and 6 months) at 4.35%. Overall, these rates of re-hospitalisation are lower than those found in developed countries, but may be underestimated.

The diagnoses at the time of first hospitalisation were essentially cardiovascular (32.5%), infectious (21.6%), tumour (21.6%) and neurological (10.8%). Among these diagnoses, decompensation of congestive heart failure and active cancers were found to be associated with re-hospitalisation. In the case of geriatric syndromes, iatrogenicity, major neurocognitive disorders and mental confusion were found to be associated with risk.

Effective prevention of these readmissions requires early identification and management of these predictive factors.

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