Study of the Prevalence and Factors Associated with the Deaths of Elderly People Hospitalised at the Fann Geriatric Unit Dakar (Senegal)

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Abstract

Objectives: To determine the characteristics of patients who died and the factors associated with death.

Methods: This was a retrospective descriptive and analytical study over a period of 17 months on a population of people aged 60 years and over hospitalised in geriatric short stay at FANN Hospital.

Results: During the study period, out of 242 hospitalised patients, 33 died, a prevalence rate of 13.6%. This prevalence was higher in older patients, with 21.1% between 90 and 94 years of age and 27.3% in patients aged 95 and over.

The average age of these patients was 78 +/- 7 years, and 75% were over 84 years of age. There was a slight female predominance (51.5%, sex ratio 0.94). The main mode of admission was referral from other services outside the hospital (61%). Fifty-five percent of patients were polypathological and 39% had multiple medications. General signs were the most frequent manifestation (60%), dominated by deterioration in general condition (73%), dehydration (39%), systemic inflammatory response syndrome (30%) and acute neurological deficit (24%). Geriatric syndromes were mainly loss of autonomy (70%), malnutrition (67%), frailty (42%) and immobilisation syndrome (21%).

Cardiovascular diseases (34%), infectious diseases (26%) and neurological diseases (13%) were more frequent. Several factors related to the mode of admission, clinical manifestations (particularly cardiovascular) and geriatric syndromes were found to be significantly associated with death.

Conclusion: In addition to highlighting the factors associated with death, our study shows that a real epidemiological transition is taking place in our regions, with the emergence of chronic diseases, particularly cardiovascular diseases, which are responsible for a high mortality rate. Infectious diseases are still a major concern, despite a decline.

Keywords : Elderly; Dakar; Factors Associated with Death; Mortality

Introduction

Aging is a gradual, continuous process of natural change that begins in early adulthood. During early middle age, many bodily functions begin to gradually decline. Common conditions in older age include hearing loss, cataracts and refractive errors, back and neck pain and osteoarthritis, chronic obstructive pulmonary disease, diabetes, depression and dementia. As people age, they are more likely to experience several conditions at the same time [1-5].

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Aging is a gradual process that causes organ system function to deteriorate and physiological reserve to dwindle. Damage theories describe cellular or molecular damage caused by environmental disturbances or metabolic by-products. The 'shortening of telomere hypothesis' is a pre-programmed ageing theory [6-10].

The ageing of populations in sub-Saharan Africa represents a real public health challenge. This demographic ageing is accompanied by a simultaneous change in the epidemiology of diseases and an increase in morbidity, often requiring hospital treatment. The hospitalisation rate for people aged over 65 is 2.5 to 4.6 times higher than for the younger population after a visit to the emergency department [11].

Aging is a progressive state, which is associated with physical, social and psychological changes. The more traditional African definitions of an elder or 'elderly' person correlate with the chronological ages of 50 to 65 years, depending on the setting, the region and the country. Geriatrics was defined as the branch of medicine that deals with the problems of old age and aging, including the clinical problems of senescence and senility [12-18].

These hospitalisations, linked to the double burden of chronic and acute pathologies and geriatric syndromes, are associated with serious complications that are life-threatening. In addition to clinical examination, standardised geriatric assessment appears to be an effective tool for screening hospitalised elderly patients for poor prognostic factors, particularly mortality [19].

Studies in developed countries have analysed factors predictive of mortality in hospitalised elderly patients, but in Africa these studies are much rarer. In Africa, the few studies that have been carried out show that deaths among hospitalised elderly people are still linked to infectious and parasitic diseases, relegating non-communicable diseases to second place [20,21]. Senegal's first university geriatrics department began inpatient activities in 2015. A pilot study of the department's hospital admissions determined the clinical and diagnostic epidemiological characteristics of these elderly patients [22]. The present study is a continuation of the latter, focusing on the outcome of these hospitalized patients and the factors associated with mortality.

Old-age population suffers from chronic diseases, and multi-morbidity. It is treated with an increasing number of drugs which arises the phenomenon of poly-pharmacy. Poly-pharmacy is defined as the concurrent use of five or more different prescription medications [23-27]. The aim of this study is to describe the characteristics of patients who died, and the factors associated with death.

Materials and Methods

This study was carried out in the geriatrics department of the Centre National Hospitalo-universitaire (CHNU) de FANN. This is a level 1 reference hospital at the top of a pyramid organisation of health structures in Senegal. It is dedicated to medical care, research and medical training. Several specialities are represented: pneumo-phthisiology, infectious diseases, cardiology, neurology, psychiatry, thoracic and vascular surgery, oral and dental services, and emergency services. It also has a biological diagnostics and medical imaging centre and a central pharmacy. The department's medical facilities include an 8-bed geriatric short-stay unit, a 2-bed day unit and an outpatient unit. In addition to consultation and hospitalisation activities, a geriatric network has been set up, with an in-hospital mobile team to respond to requests for advice from the hospital's various departments, and an out-of-hospital mobile team to provide home visits for frail patients who are known to the department.

We conducted a retrospective descriptive and analytical study over a 17-month period from 01/08/2019 to 31/12/2020. All deceased patients aged 60 or over hospitalised in the department during the study period were included.

Epidemiological, clinical, diagnostic and complication data were collected on a survey form medical records. These data were entered and analysed using Excel 2019 and Epi info 7.2.5.0 software.

In the descriptive study, the qualitative variables were expressed as numbers and percentages, and the quantitative variables as the mean with its standard deviation, as well as the median and extremes. Tables were drawn up to illustrate certain variables.

In the analytical study, we compared patients who had died with those who had not, and cross-tabulations were carried out according to epidemiological, clinical (geriatric syndromes), diagnostic and progression (complications, average length of stay) characteristics in order to identify risk factors associated with

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death. 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

Descriptive study

Epidemiological characteristics

During the 17-month study period, 33 of the 242 patients admitted to hospital died, giving a prevalence rate of 13.6%. The prevalence of death was higher in older patients, with 21.1% between 90 and 94 years old and 27.3% in patients aged 95 and over. The death rate was higher for men (14.5%) compared with women (12.8%). The months with the highest death rates, in chronological order, were March 2020 (38.4%), July 2020 (28.6%) and August 2020 (30.8%) (Table 1).

Variables		Prévalence mortality N= 33 (%)	Total population (N = 242)	P
Age groups	60-64	0 (00.00)	15	NS*
	65-69	5 (11.36)	44	NS
	70-74	6 (20.00)	30	NS
	75-79	6 (13.95)	43	NS
	80-84	5 (10.00)	50	NS
	85-89	4 (13.33)	30	NS
	90-94	4 (21.05)	19	NS
	Over 95 years	3 (27.27)	11	NS
Gender	Male	16 (14.55)	110	NS
	Femal	17 (12.88)	132	
Months	August 19	0 (0.00)	7	NS
	September 19	1 (6.67)	15	NS
	October 19	2 (8.00)	25	NS
	November 19	3(15.00)	20	NS
	December 19	1 (7.69)	13	NS
	January 20	0 (0.00)	20	NS
	February 20	2 (12.50)	16	NS
	March 20	5 (38.46)	13	0.02
	April 20	1 (7.14)	14	NS
	May 20	0 (0.00)	7	NS
	june 20	2 (18.18)	11	NS
	August 19	2 (28.57)	7	NS
	September 19	4 (30.77)	13	NS
	October 19	1 (5.56)	18	NS
	November 19	5 (26.32)	19	NS
	December 19	2 (16.67)	12	NS
	January 20	2 (16.67)	12	NS

Table 1: Prevalence of mortality by age, sex and month.

* NS: non-significant.

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The patients who died ranged in age from 65 to 102, with an average age of 78 +/- 7. Half were over 78 years old and 75% were over 84. There was a slight female predominance 51.5% (sex ratio 0.94). The main mode of admission was referral from other services outside the hospital (61%). Eighteen percent were admitted to hospital following a consultation on the department, 12% from the hospital emergency department and 9% following a consultation at home by the department's mobile geriatric team (Table 2).

Variables		Deceased = 33 N (%)	Total population (242)	P
Age groups	60-64	0 (00.00)	15	NS*
	65-69	5 (15.15)	44	NS
	70-74	6 (18.18)	30	NS
	75-79	6 (18.18)	43	NS
	80-84	5 (15.15)	50	NS
	85-89	4 (12.12)	30	NS
	90-94	4 (12.12)	19	NS
	Over 95 years	3 (9.09)	11	NS
Gender Sex-ratio 0.94	Male	16 (48.48	110	NS
	Femal	17 (51.51)	132	
Entry mode	Emergency Service	4 (12.12)	99	0.0002
	Outpatient referral	20 (60.60)	85	0.0015
	Consultation Service	6 (18.18)	19	NS
	Home consultation	3 (9.09)	39	NS

Table 2: Epidemiological characteristics of patients.

* NS: non-significant.

Clinical characteristics

Reasons for hospitalisation were dominated by acute disorders of consciousness and refusal to eat (33% each). The main antecedents were cerebrovascular accidents (21%), repeated falls (18%) and thrombo-embolic disease (15%). The most frequent comorbidities were arterial hypertension 58%, cardiomyopathy 52%, diabetes 24% and osteoarticular disorders 18%. Polypathology (≥2) affected 55% of patients who died, and Polymedication (≥5) 39%. Ninety-three per cent lived with their family, 42% were frail and 18% had a chronic loss of autonomy (Table 3).

Variables		Deceased = 33 N (%)	Total population (242)	P
Reasons for hospitalisation	Acute consciousness disorders	11 (33.33)	82	NS*
	Refusal to eat	11 (33.33)	63	NS
	Acute gastroenteritis	3 (9.09)	19	NS
	Decompensated diabetes	2 (6.06)	11	NS
	Fall with or without malaise	1 (3.03)	10	NS
	Acute cardiac decompensation	2 (6.06)	6	NS
	Acute hypertension	2 (6.06)	5	NS
	Acute retention of urine	0 (0)	2	NS
	Large inflamed leg	0 (0)	5	NS
	Acute consciousness disorders	0 (0)	1	NS

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Previous history	Previous surgery	7 (21.21)	73	NS
	Cerebrovascular accident	7 (21.21)	49	NS
	Repeated falls	6 (18.18)	19	0.042
	Behavioural problems	0 (0)	4	NS
	Thromboembolic disease	5 (15.15)	8	0.0014
	Tuberculosis	1 (3.03)	5	NS
Comorbidities	Hypertension	19 (57.58)	139	NS
	Cardiomyopathies	3 (9.09)	37	NS
	Atrial fibrillation	2 (6.06)	12	NS
	Lower limb arterial disease	2 (6.06)	6	NS
	Diabetes	8 (24.24)	54	NS
	Osteoarticular diseases	6 (18.18)	41	NS
	Epilepsy	1 (3.03)	19	NS
	Cognitive disorders	3 (9.09)	41	NS
	Parkinson's disease	3 (9.09)	5	0.019
	Tumour disorders	4 (12.12)	15	NS
	Chronic	2 (6.06)	12	NS
	Hypertension	1 (3.03)	12	NS
	Cardiomyopathies	2 (6.06)	6	NS
	Atrial fibrillation	1 (3.03)	5	NS
Multiple pathology and medications	≥ 2 Comorbidities	18 (54.55)	75	NS
	≥ 5 médications	13 (39.39)	47	0.0037
Lifestyle	Frailty	14 (42.42)	80	NS
	Chronic loss of autonomy	6 (18.18)	76	NS

Table 3: Clinical characteristics of patients.

* NS: non-significant.

General signs were the most common symptoms (60.21%), followed by physical signs (28%). Functional signs accounted for only 12%. The most frequent clinical manifestations were impairment of general condition 73%, dehydration 39%, systemic inflammatory response syndrome 30%, acute neurological deficit 24%, pulmonary condensation syndrome 21%, skin and mucous membrane pallor 21% and pain 18%. The main geriatric syndromes were loss of autonomy (70%), malnutrition (67%), frailty (42%) and immobilisation syndrome (21%) (Table 4).

Sign Types	Signs	Deceased (33) N (%)	Total population (242)	P
Functional signs 11.82%	Pain syndromes	6 (18.18)	37	NS*
	Dyspnea	5 (15.15)	10	0.0053
General signs 60.21%	Altered general condition	24 (72.72)	122	0.008
	Dehydration	13 (39.39)	75	NS
	Pressure sores	2 (6.06)	75	0.0004
	Systemic inflammatory syndrome	10 (30.30)	61	NS
	Pale skin and mucous membranes	7 (21.21)	31	NS

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Cardiovascular signs 6.45%	Acute circulatory failure	4 (12.12)	8	0.013
	Cardiac rhythm disorders	1 (3.03)	3	NS
	Arterial hypotension	1 (3.03)	1	NS
Lung signs 7.52%	Pulmonary condensation syndrome	7 (21.21)	30	NS
Neurological signs 11.82%	Acute neurological deficit	8 (24.24)	58	NS
	Behavioural disorders	3 (9.09)	20	NS
	Meningeal syndrome	0 (0)	1	NS
Digestive signs 2.15%	Sub-occlusive syndrome	1 (3.03)	9	NS
	Fecal impaction	1 (3.03)	3	NS
Assessment Geriatric	Undernutrition	22 (66.66)	164	NS
	Loss of functional autonomy	23 (69.69)	128	0.04
	Fragility	14 (42.42)	80	NS
	Immobilisation syndrome	7 (21.21)	48	NS
	Confusion	3 (9.09)	43	NS
	Major neurocognitive disorders	3 (9.09)	30	NS
	Depression	1 (3.03)	17	NS

Table 4: Distribution of patients according to clinical manifestations and geriatric syndrome on admission.

* NS: non-significant.

Cardiovascular pathologies were more common (34.3%), followed by infectious diseases (25.7%), neurological diseases (12.9%), tumours (11.4%) and haematological diseases (7%). The first-line diagnoses were hypertensive crisis and infectious pneumonitis, each 39%. These were followed by ischaemic stroke 27% and severe anaemia 21% (Table 5). The average hospital stay was between 1 and 25 days, with an average of 7 days (±4.6). Complications during hospitalisation were mainly cardiovascular and infectious (24% each). Decompensation of heart failure (18%), severe kidney disease (12%), skin infections (12%) and severe anaemia (12%) were more frequent (Table 5).

Organ diagnostics	Deceased (33) N (%)	Total Population (242)	P
Cardiovascular	24 (34.28)		
Arterial hypertension crisis	13 (39.39)	79	NS
Acute cardiac decompensation	4 (12.12)	24	NS
Atrial fibrillation and other rhythm disorders	1 (3.03)	11	NS
Thromboembolic disease	2 (6.06)	7	NS
Severe lower limb arteriopathy	1 (3.03)	7	NS
Cardiovascular collapse	2 (6.06)	3	0.04
Pericarditis	1 (3.03)	1	NS
Infectious	18 (25.71)		
Infectious lung disease	13 (39.39)	72	NS
Infection with an unidentified portal of entry	2 (6.06)	12	NS
Oropharyngeal candidiasis	2 (6.06)	6	NS

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Dermo-hypodermatitis	1 (3.03)	3	NS
Neurological	9 (12.86)		
Ischaemic stroke	9 (27.27)	46	NS
Tumour	8 (11.43)		
Prostate tumour	2 (6.06)	21	NS
Hepatocellular carcinoma	1 (3.03)	2	NS
Biliary tract tumour	1 (3.03)	2	NS
Tumour metastases x	1 (3.03)	2	NS
Bladder tumour	1 (3.03)	1	NS
Brain tumour	1 (3.03)	1	NS
Malignant haemopathy	1 (3.03)	5	NS
Haematological	7 (10)		
Severe anaemia**	7 (21.21)	34	NS
Other	4 (5.71)		
Decompensated diabetes	2 (6.06)	21	NS
Post-traumatic fracture	1 (3.03)		NS
Faecal impaction	1 (3.03)	9	NS
Complications	N =17	Total complications	P
Nephrology 17.65%			
Severe kidney disease***	2 (11.76)	5	NS
Acute renal failure	1 (6.25)	4	NS
Cardiovascular 23.53%			
Decompensation Heart failure	3 (17.65)	3	0.049
Thromboembolic disease	1 (5.88)	3	NS
Infectious 23.53%			
Urinary	1 (5.88)	1	NS
Lung	1 (5.88)	5	NS
Cutaneous	2 (11.76)	7	NS
Others complications			
Severe anaemia **	2 (11.76)	5	NS
Convulsion	1 (5.88)	1	NS
Confusion	1 (5.88)	3	NS
Ionic disorders	1 (5.88)	11	NS

Table 5: Distribution by diagnosis and complications.

* NS: non-significant

** Severe anaemia (poorly tolerated or Hb ≤ 7g/dl)

*** Severe kidney disease.

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Analytical study

Several factors were significantly associated with death (p < 0.05).

Epidemiological

These were hospitalisation in March 2020 (OR 4.44; CI [1.07-16.72]); admission by referral from hospital external services (OR 3.39; CI [1.50; 7.90]) or by referral from the hospital emergency service (OR 0.17; CI [0.04; 0.49]).

Clinically

We were joined by :

- A history of thromboembolic venous disease (OR 12.03; CI [2.20-81.69]), Parkinson's disease (OR 10.17; CI [1.12-126.44]), a history of repeated falls (OR 3.32; CI [0.96-10.39]) and polymedication (OR 3.32; CI [1.38-7.83]).

- The clinical manifestations were: dyspnoea (OR 7.18; CI [1.55-33.39]); cardiovascular collapse (OR 13.16; CI [0.67-90.71]) and deterioration in general condition (OR 3; CI [1.27-7.72]).

- For geriatric syndromes, loss of functional autonomy (OR 2.27; CI [0.98-5.62]) and the presence of pressure sores (OR 0.12; CI [0.01-0.49]) were found.

Progression

Decompensation of heart failure was the only complication associated with mortality (OR13.16; CI [0.67; 790.71]).

No diagnosis of an organ was found to be significantly associated with death.

Discussion

This descriptive and analytical study shows the main epidemiological and diagnostic aspects of elderly patients who died in short-stay geriatric hospitals, but above all it highlights the factors associated with death. The main limitations were related to the retrospective nature of the study, with some incomplete medical records, and the limited number of studies on factors predictive of mortality.

During the study period, 33 out of 242 hospitalised patients died, representing an estimated prevalence of 13.6%. Data on the mortality of elderly people hospitalised in Africa are limited and unreliable [20]. In Bamako, in the internal medicine department of the University Hospital of Point-G, a study investigating morbidity and mortality in the elderly found a much higher prevalence of death of 28% [21]. Elsewhere in France, Rousseau [28] in 2018 found a prevalence very similar to ours, at 13.3%.

Patients were between 65 and 102 years old, with an average age of 78 +/- 7. Half were over 78 years old and 75% were over 84 years old. This shows the fairly high age of our population, considering that life expectancy in Senegal in 2020 was estimated at 67.8 years [29]. The prevalence of death in our series was higher in the oldest age group, affecting almost half, with 48% over the age of 90. In Canada, a study [30] of mortality by age group, including 1,000 people, reported that the 90-and-over age group was over-represented in terms of deaths during the period 2016-2020. In developed countries, the average age of death in hospital generally appears to be over 90 [28,31]. Several factors, such as more favourable socio-economic and health conditions, may explain this later age of death. There was a slight predominance of women at 51.5% (sex ratio 0.94), although the prevalence of death was higher among men at 14.5%.

In chronological order, the months with the highest death rates were March 2020 (38.4%) and July and August 2020 (28.6% and 30.8% respectively). It should be noted that this period of high mortality corresponds to the first epidemic wave of Covid 19 infection in Senegal, which lasted from March to October 2020 [32,33]. During this period, the health system was disorganised and hospital mortality rates linked or not to Covid 19 infection were higher.

In addition to an average age (78 years) that was quite advanced for our context, our patients presented geriatric characteristics before admission, 42% were frail and 18% already had a chronic loss of autonomy. Polypathology (≥2) concerned 55% and Polymedication (≥5) 39%. The most common comorbidities were arterial hypertension (58%), cardiomyopathy (52%) and diabetes (24%). Socially, family isolation was uncommon, with 93% living with their families. Even with the changes in the organisation of the family unit in Africa [34,35], many elderly people still live with their families, although the help they need is not always available.

Reasons for hospitalisation were dominated by acute disorders of consciousness and refusal to eat (33% each). These acute

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disorders of consciousness were of the confusion or vigilance type. Neurological ageing and neurodegenerative pathologies predispose the elderly to a fragile central nervous system and expose them to an increased risk of confusion in the context of even the slightest stress. Among elderly people hospitalised in medical or surgical wards, the frequency of confusion varies between 10 and 30% [36,37]. As for the refusal to eat described in our context, it most often concerned frail patients presenting a categorical refusal to ingest food or water for a few days to a week, with serious acute complications that could compromise the vital prognosis. Like a geriatric syndrome, the causes of this refusal to eat could be linked to a variety of physical, psychological or social factors, and was often accompanied by an acute loss of autonomy. A survey is currently being carried out in the department to investigate its link with ageing, so that it can be considered as a real geriatric syndrome.

A great heterogeneity of clinical manifestations was noted, dominated by general signs (60%) and physical signs (28%), while functional signs represented only 12% of manifestations. In the elderly, particularly the frail, the symptomatology is often characterised by a rich variety of general signs, contrasting with a paucity of functional signs. This highlights the importance of a good physical examination as a key to diagnosis. In our patients, physical signs accounted for 28% of symptoms.

Loss of autonomy (70%), malnutrition (67%), frailty (42%) and immobilisation syndrome (21%) were the main geriatric syndromes. These geriatric syndromes are common in the elderly and worsen the prognosis of patients [22]. Rousseau [28] also found other geriatric syndromes to be factors in early mortality in elderly hospital patients: severe neurocognitive disorders (44.9%), depression (25.6%) and repeated falls (11.5%).

To date, studies in Africa have shown that deaths among hospitalised elderly people are still linked to infectious and parasitic diseases, relegating non-communicable diseases, particularly cardiovascular diseases, to second place [20,21]. As far back as 1983, a study in Cotonou [38] found that infectious and parasitic diseases were the main causes of death among people hospitalised for internal medicine (27.4%), followed by cardiovascular diseases (18.5%), digestive diseases (14.6%), respiratory diseases (11.9%) and neurological diseases (11.1%). A more recent study in Bamako

[21] in 2015 showed similar results among people aged 65 and over. Deaths were more related to infectious and tropical diseases (23.3%), with other digestive diseases (21.8%), cardiovascular diseases (15.6%) and tumours (15%) taking second place. This same trend was confirmed in Burkina Faso [39]. In our cohort, cardiovascular diseases were more frequently diagnosed (34%), followed by infectious diseases (26%), neurological diseases (13%) and tumours (11%). The first-line diagnoses were hypertensive crisis and infectious pneumonitis (39% each), followed by ischaemic stroke (27%) and severe anaemia (21%). This shows that a real epidemiological transition is in progress, with chronic diseases, particularly cardiovascular diseases, increasingly emerging ahead of infectious diseases and responsible for high mortality. In African countries, the improvement in social and health conditions is increasingly relegating infectious diseases, particularly transmissible diseases, to second place, although these diseases are still a major problem [40]. In developed countries, deaths are still linked to chronic diseases. In France, Leclerc., *et al*. [41] reported that cardiovascular diseases were in first place, followed by senility, ill-defined symptoms and morbid states, digestive and respiratory diseases, and tumours. In Canada, in 2020, Mattiuzi., *et al*. [42] showed that in the over-60 age group, ischaemic heart disease, stroke and chronic obstructive pulmonary disease were the main causes of disability and death in the elderly.

In the case of deceased patients, the very short average length of stay of 7 days may be explained by the severity of the illness, but especially by the patients' financial resources, which are often very low, limiting the quality of care. According to Barberger., *et al*. [43], in developed countries the average length of stay for elderly patients who die appears to be much longer.

Like the diagnoses, the complications were essentially cardiovascular and infectious (24% each). Cardiovascular complications were mainly linked to decompensation of heart failure (18%) and venous thrombo-embolic disease (6%). These cardiovascular complications show the importance of risk factors including advanced age, lifestyle, and chronic pathologies such as arterial hypertension and diabetes. A study of cardiovascular risk factors in people aged 65 and over [44] showed a correlation between these factors and the occurrence of these complications. The higher the levels of risk factors, the greater the cardiovascular complications (14% for one risk factor, 25% for two and 50% for

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more than three). Infectious complications were dominated by skin infections (12%). These complications are insidious in elderly and frail patients, leading to delays in diagnosis and management. They represent the 3rd leading cause of death after the age of 65, with an estimated prevalence of 15% affecting the most frail patients [45].

In the analytical study, several factors were found to be significantly associated with death:

In epidemiological terms, the first was hospitalisation in March 2020 (OR 4.44). As described above, March 2020 corresponded to the start of the first wave of Covid 19 infection in Senegal, which partially explains the high death rate recorded during this period. Patients were also referred from external hospital services (OR 3.39) or from the hospital emergency department (OR 0.17). The critical condition of patients at the time of transfer and the often difficult transfer conditions (non-medicalised ambulances, insufficient number of ambulances) may explain the significant death rates.

Clinical aspects :

- Thromboembolic venous disease (OR 12.03), Parkinson's disease (OR 10.17), repeated falls (OR 3.32) and polymedication (OR 3.32) were predictive of death in the elderly. This highlights the significant burden of associated comorbidities and geriatric syndromes and the urgent need for preventive intervention in public health care [46].

- The clinical manifestations associated with mortality were cardiovascular collapse (OR 13), dyspnoea (OR 7) and altered general condition (OR 3). Cardiovascular collapse and dyspnoea are signs of severity that can directly affect vital prognosis, while deterioration in general condition is the result of chronic malaise due to ageing and chronic pathologies.

- For geriatric syndromes, loss of functional autonomy (OR 2.27) and immobilisation syndrome through the existence of pressure sores (OR 0.12) were found to be associated with mortality. Rozzini., *et al*. [47] highlighted the relationship between loss of autonomy before admission to hospital and mortality in the elderly. In the SAFES (Sujet Âgé Fragile Évaluation Suivi) cohort [11], which focused on frail elderly patients, Dramé., *et al*. found other factors to have a significant impact on death, such as severe undernutrition, neurocognitive disorders, mental confusion and walking disorders.

In terms of progression, decompensation of heart failure was the only complication significantly associated with mortality (OR 13). In terms of mortality, heart failure is the second leading cause of death in men over 65 after lung cancer, and in the most advanced stages, mortality can be as high as 50% at 5 years [48].

Conclusion

In Africa, data on mortality in elderly hospital patients are limited. In our series, we found a prevalence of 13.6%, which is in accordance with data in the literature from developed countries. This prevalence was higher in the oldest age groups, 21% in the 90 to 94 age group and 27% in the 95 and over age group. Studies in sub-Saharan Africa show that deaths among hospitalised elderly people are still linked to infectious and parasitic diseases, relegating non-communicable diseases to second place. Our results show that a real epidemiological transition is taking place in our regions, with the emergence of chronic diseases, particularly cardiovascular diseases, which are responsible for high mortality, while infectious diseases persist despite a decline. Several risk factors were found to be significantly associated with mortality in our elderly patients, mainly patients referred from the emergency department or outpatient departments, highlighting not only the management of patients in the emergency department, but above all the quality of the transfer in our context. Thrombo-embolic venous disease, Parkinson's disease, repeated falls or polymedication, reflecting the importance of managing co-morbidities and geriatric syndromes. The presence of dyspnea, cardiovascular collapse and deterioration in general or geriatric condition, with loss of functional autonomy or bedsores. Decompensation of heart failure during the course of the disease was also associated with mortality.

If these risk factors are to be properly controlled, the geriatric care network needs to be improved by training geriatricians and making them available in emergency departments, improving patient transfer conditions, and early management of chronic pathologies, particularly cardiovascular (control of risk factors) and geriatric syndromes, by systematically screening patients using short assessment scales and referring them to specialist services.

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