

Falls in the Elderly at Angre University Hospital

Lauret Kouassi^{1*}, Gilles Renaud Kouamé¹, N'Guessan Michel Konan², Aïchata Bamba³,
Salifou Koné¹, Ubrich Venceslas Acko³, Gnadou Stéphane Keny Yapa¹, Kadidiata Hamed Touré¹,
Famoussa Koné¹, Jean Kévin Acho¹, Kobenan Kouman Landry Gboko¹, Yao Omer Binan³

¹Department of Internal Medicine, Bouaké University Hospital, Bouaké, Ivory Coast

²Department of Internal Medicine, Treichville University Hospital, Abidjan, Ivory Coast

³Department of Internal Medicine and Geriatrics, Angre University Hospital, Abidjan, Ivory Coast

Email: *lawretk@gmail.com

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Abstract

Background: Falls in older people can have serious consequences for their well-being and life expectancy. However, the information available remains insufficient in our context. **Objective:** The overall aim is to contribute to a better understanding of falls in the elderly. **Material and Method:** This is a retrospective, descriptive study of the records of patients aged 65 and over who consulted a geriatric unit in Côte d'Ivoire. It focused on patients who had reported at least one fall in the 12 months preceding their consultation, regardless of where the fall occurred. **Results:** Prevalence was 14%, with an average age of 75.4 years and a sex ratio of 0.5. Balance and walking disorders were the main pathological cause of falls (50%). Most patients (87%) lived in the city and were faced with inadequate lighting (37%) and inappropriate footwear (95.4%). The main drug treatments followed were antihypertensive drugs (25%), followed by anticoagulants (13.9%). Falls occurred while walking (35.2%) and standing (23.1%), and were repeated in 49.1%. The traumatic consequences were mainly limb pain (27.8%) and arthralgia (22.2%) were the most common and also, 65.7% could not recover without assistance. Depression was found in 9.3% of patients. The trend was marked by a mortality rate of 5.5% of cases. **Conclusion:** Falls are frequent, caused by problems with balance and walking, and by environmental factors. They can have serious traumatic consequences and major psychological repercussions.

Keywords

Falls, Elderly, University Hospital, Ivory Coast

1. Introduction

A fall is an accident that occurs when a person falls to the ground or lands on a

lower surface than where they were initially standing. Unlike injuries resulting from intentional events such as suicide, road accidents, accidents at work or assaults [1], falls are a major public health issue, particularly among the elderly [2]. Falls can have serious consequences, including morbidity problems, increased mortality, loss of independence and an increased risk of institutionalization [3]. Worldwide, according to a WHO report, more than a third of people aged 65 and over suffer falls each year, with the rate rising to between 32% and 42% in people aged 70 and over [1]. After the age of 80, this rate rises to one in two people [4]. This problem is widely recognized and well documented, particularly in developed countries [5]. In the United States and the United Kingdom, around a third of people aged over 65 fall every year. In France, in 2010, more than 21% of people aged 55 to 85 reported having fallen in the last 12 months. In Belgium, the incidence of falls is estimated at 2.2 per 1000 for women aged 65 to 74 and 12 per 1000 for women aged 75 to 84 [5]. In Beijing, China, one study found a prevalence of 18%, while in Brazil, 32.5% of older people reported having fallen in the past year [6]. However, in low-income countries, particularly in Africa, research into falls among the elderly remains limited. This situation is particularly marked in countries where geriatrics is still a developing discipline, leading to a paucity of data and great variability in results, with prevalence ranging from 11.2% to 60.3% [7]. In Côte d'Ivoire, studies on this subject are also rare. It was against this backdrop that this study was conducted with the aim of gaining a better understanding of falls among the elderly in Côte d'Ivoire.

2. Patients and Method

2.1. Patients

This retrospective and descriptive study was conducted over a six-month period, from 15 May 2023 to 15 October 2023, in the geriatrics consultation unit of the Internal Medicine and Geriatrics Department of the Angré University Hospital, one of the few health establishments in Côte d'Ivoire with a geriatrics department. The target population consisted of the records of patients aged 65 years and over, of both sexes, who consulted this service during the study period and who had suffered at least one fall during the 12 months preceding their hospitalization, regardless of where the incident occurred. The records excluded were those of patients aged 65 and over who had not reported any falls, as well as those with incomplete information on the parameters studied. Of the 772 patients who consulted a doctor during the study, 143 suffered at least one fall. Of these, 35 files with incomplete information were eliminated, resulting in the selection of 108 files for analysis (see [Figure 1](#)).

2.2. Methods

Data were collected using a questionnaire designed on the basis of information extracted from each patient's medical records. The questionnaire covered a number of socio-demographic aspects, such as age, sex, marital status, socio-economic

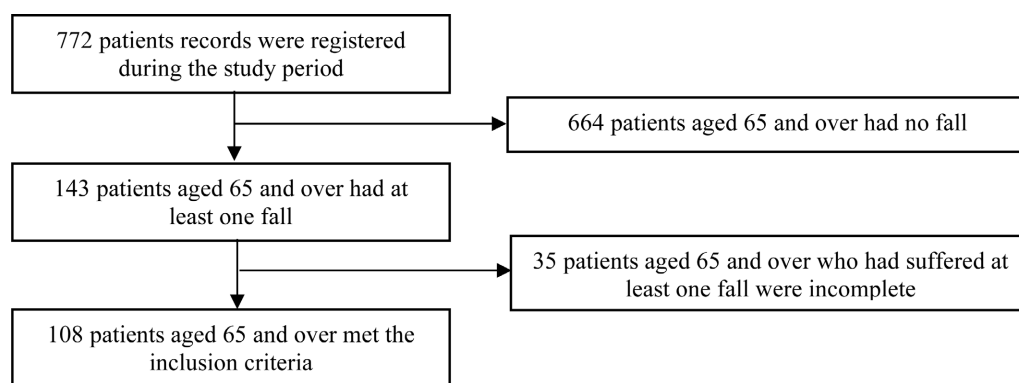


Figure 1. Selection process for the study.

status, as well as medical and surgical history and any co-morbidities. It also included elements for diagnosing falls in the elderly, based on information gathered during questioning and clinical examination. It also included questions to identify risk factors, the causes of falls, the number of falls during the study period, the consequences of falls, and changes in the patient's condition during hospitalization. With regard to the risk factors associated with falls in elderly patients, several criteria were taken into account. Intrinsic factors include alcohol consumption, level of physical activity, the presence of chronic pathologies and the use of medication that can contribute to falls. Vision problems, dizziness, and problems with balance or mobility were also mentioned. Environmental factors such as the presence of obstacles in the home, the quality of lighting and patients' footwear habits were also identified. Finally, social and psychological factors were taken into account, including social isolation, depression and fear of falling.

In this article, we defined a fall as any unintentional incident in which a person falls to the ground or onto a surface lower than the one on which they were initially standing [1]. Patients' socio-economic status was determined on the basis of their ability to cover their healthcare expenses and their daily needs, as indicated in their medical records. Patients with a low standard of living were those who had difficulty meeting these expenses.

For the diagnosis of balance and gait disorders, we based ourselves on the signs mentioned in the patient's medical records, namely the sensation of vertigo or instability, stiffness or slowness in walking, and the inability to maintain an upright posture [8]. For osteoarthritis, the clinical criteria were joint pain, often accentuated by physical activity and relieved at rest, and joint stiffness, particularly on waking. Radiographic imaging criteria included characteristic signs such as reduced joint space, the presence of osteophytes (bony growths) and subchondral sclerosis, manifested by a thickening of the bone beneath the cartilage [9].

To assess osteoporosis, we took into account anamnestic, clinical and imaging criteria independently of age and sex. With regard to history, we examined the patient's medical history, in particular, the occurrence of fractures, especially those occurring spontaneously or after minor trauma. We also considered a family history of fractures or bone pathologies, which could indicate a genetic predispo-

sition to osteoporosis. In addition, body mass index (BMI) was assessed, with a low BMI (less than 18.5 kg/m²) being associated with a higher risk of developing the disease [10]. On the imaging side, the results of examinations such as radiography, computed tomography (CT) or magnetic resonance imaging (MRI) were analyzed. The imaging criteria include a decrease in bone density, the search for fractures, and the presence of signs of increased bone fragility, such as thinning of the cortical areas of bone and increased bone transparency [10].

The data were entered and processed using Epi Info 7 software. Quantitative variables were described by means and standard deviation. Qualitative variables were expressed as proportions, including extreme values.

3. Results

During the course of the study, the medicine and geriatrics department registered 772 patients aged 65 and over. Of these patients, 108 had suffered falls, representing a prevalence of 14%. The average age of the patients was 75.4, ranging from 60 to 103. In addition, 52.7% of patients who fell were aged 75 or over. Of these patients, 35 were male and 73 were female, giving a sex ratio of 0.5. Only 14.8% of patients were married and 74.1% did not have a spouse, of whom 48.2% were widowed and 25.9% were single. The majority of patients who suffered a fall (79.6%) were of low socio-economic status (Table 1). Pathological factors were dominated by problems with balance and walking (50%), followed by osteoarthritis (29.6%) and visual problems (16.7%) (Table 2). In terms of other comorbidities, hypertension was present in 53.7% of patients, followed by diabetes (20.4%) and heart disease (11.1%) (Table 3). In terms of environmental factors, 87% of patients lived in urban areas and 77.8% in Ground-level house. Lighting was inadequate in 37% of cases, and 7.4% of patients had unsuitable toilets. In addition, 95.4% of patients wore inappropriate footwear (Table 4). In terms of drug treatments prior to falls, antihypertensives were the most commonly prescribed (25%), followed by anticoagulants (13.9%) and antidiabetics (13%) (Table 5). Falls among elderly patients occurred mainly while walking (35.2%) and standing (23.1%) (Table 6). On average, each patient had suffered 1.9 falls in the previous 12 months and 49.1% had suffered repeated falls (Table 6). Falls were the most frequent cause of consultation, accounting for 33.3% of cases. However, 66.7% of patients were consulted for reasons other than falls, mainly for polyarthritis (16.7%) or a geriatric examination (13%) (Table 7). Post-fall clinical signs revealed that pain was common (50%), affecting either the whole limb (27.8%) or specifically the joints (22.2%). Other notable symptoms included dizziness (16.7%) and fever (11.1%) (Table 8). Regarding the direct consequences of falls, a majority of patients (65.7%) were unable to get up on their own. The most common injuries were dislocations and sprains (7.4%), followed by contusions (6.5%). Fractures were relatively rare (5.6%, or 6 patients out of 108). From a medical perspective, urinary tract infections (9.3%) and dehydration (8.3%) were the most common complications. Regarding the psychological impact, fear of falling affected a quarter of patients (25.9%), and almost 10%

(9.3%) had depressive symptoms (**Table 9**). A mortality rate of 5.5% was observed, with five deaths from falls.

Table 1. Breakdown of 108 elderly fallers by socio-demographic characteristics.

| Socio-demographic characteristics | Numbers (n = 108) | Percentages (%) |
|-----------------------------------|-------------------|-----------------|
| Age groups | | |
| 60 to 65 years | 10 | 09.3 |
| 65 to 69 years | 23 | 21.3 |
| 70 to 74 years | 18 | 16.7 |
| 75 to 79 years | 27 | 25 |
| 80 to 84 years | 14 | 13 |
| 85 to 89 years | 6 | 05.5 |
| 90 and over | 10 | 09.2 |
| Socio-economic situation | | |
| Low | 86 | 79.6 |
| Moderate to high | 22 | 20.4 |
| Marital status | | |
| Married | 16 | 14.8 |
| Single | 28 | 25.9 |
| Divorced | 12 | 11.1 |
| Widowed | 52 | 48.2 |

Table 2. Intrinsic risk factors and other co-morbidities.

| Intrinsic risk factors and co-morbidities | Numbers (n = 108) | Percentages (%) |
|---|-------------------|-----------------|
| Neuropsychological factors | | |
| Dementia | 12 | 11.1 |
| Cognitive decline | 08 | 07.4 |
| Parkinson's disease | 06 | 05.6 |
| Depression | 02 | 01.9 |
| Other pathologies | | |
| Balance and walking disorders | 54 | 50.0 |
| Osteoarthritis | 32 | 29.6 |
| Osteoporosis | 26 | 24.1 |
| Visual impairment | 18 | 16.7 |
| Stroke | 08 | 07.4 |

Table 3. Other comorbidities.

| Other comorbidities | Numbers (n = 108) | Percentages (%) |
|--|-------------------|-----------------|
| High blood pressure | 58 | 53.7 |
| Diabetes | 22 | 20.4 |
| Heart disease | 12 | 11.1 |
| Gout | 08 | 07.4 |
| Tumours | 06 | 05.6 |
| Human immunodeficiency virus (HIV) infection | 04 | 03.7 |
| Hypothyroidism | 02 | 01.9 |
| Asthma | 02 | 01.9 |
| Bone marrow plasmacytosis | 01 | 00.9 |

Table 4. Extrinsic risk factors.

| Extrinsic risk factors | Numbers (n = 108) | Percentages (%) |
|--|-------------------|-----------------|
| Environmental factors | | |
| Place of residence | | |
| Urban setting | 94 | 87 |
| Rural setting | 14 | 13 |
| Type of housing | | |
| Ground-level house | 84 | 77.8 |
| High-rise house | 24 | 22.2 |
| Quality of lighting in the home | | |
| Satisfactory | 68 | 63 |
| Poor | 40 | 37 |
| Quality of toilet | | |
| Adapted | 100 | 92.6 |
| Not adapted | 08 | 07.4 |
| Quality of footwear | | |
| Not adapted | 103 | 95.4 |
| Adapted | 05 | 04.6 |
| Behavioural factors | | |
| Alcoholism | 06 | 05.6 |

Table 5. Breakdown of elderly patients by drug treatment prior to the fall.

| Treatment | Numbers (n = 108) | Percentages (%) |
|------------------------|-------------------|-----------------|
| Antihypertensive | 61 | 25 |
| Anticoagulant | 26 | 13.9 |
| Antidiabetic | 17 | 13 |
| Antiretroviral drugs | 03 | 02.8 |
| Hypouricemic | 03 | 02.8 |
| Analgesic | 03 | 02.8 |
| loop diuretic | 03 | 02.8 |
| Anticancer agent | 02 | 01.9 |
| Antiparkinsonian | 02 | 01.9 |
| Proton pump inhibitors | 02 | 01.9 |
| Antitubercular agent | 02 | 01.9 |

Table 6. Distribution of patients according to the circumstances in which the fall occurred and the number of falls.

| Circumstances of occurrence | Numbers (n = 108) | Percentages (%) |
|-----------------------------------|-------------------|-----------------|
| Walking | 38 | 35.2 |
| Standing up | 25 | 23.1 |
| Slipping | 08 | 07.4 |
| Stumbling on uneven ground | 08 | 07.4 |
| Stumbling on stairs | 05 | 04.6 |
| Sitting down | 05 | 04.6 |
| Obstacles indoors | 04 | 03.7 |
| Going to the toilet | 03 | 02.8 |
| Spontaneous with no obvious cause | 02 | 01.9 |
| Working in the fields | 02 | 01.9 |
| Drowsiness | 01 | 00.9 |
| Drunkenness | 01 | 00.9 |
| Unspecified circumstances | 06 | 05.6 |
| Number of falls | | |
| One fall | 55 | 50.9 |
| Two falls | 22 | 20.4 |
| Four falls | 23 | 21.3 |
| Five falls | 05 | 04.6 |
| Circumstances of occurrence | 03 | 02.8 |

Table 7. Breakdown of elderly patients suffering from falls by reason for consultation.

| Reason for consultation | Numbers (n = 108) | Percentages (%) |
|---------------------------------|-------------------|-----------------|
| Falls | 36 | 33.3 |
| Polyarthralgia | 18 | 16.7 |
| Geriatric assessment | 14 | 13 |
| Confusion | 10 | 09.3 |
| Impaired general condition | 08 | 07.4 |
| Loss of functional independence | 06 | 05.6 |
| Otorhinolaryngological symptoms | 04 | 03.7 |
| Gait disorder | 04 | 03.7 |
| Refusal to eat | 02 | 01.9 |
| Resting tremor | 02 | 01.9 |
| Urinary incontinence | 02 | 01.9 |
| Memory impairment | 02 | 01.9 |

Table 8. Breakdown of elderly patients who have fallen according to the clinical signs presented after the fall.

| Clinical signs | Numbers (n = 108) | Percentages (%) |
|---------------------------------|-------------------|-----------------|
| Musculoskeletal signs | | |
| Limb pain | 30 | 27.8 |
| Arthralgia | 24 | 22.2 |
| Gait disturbance | 04 | 03.7 |
| Deficit syndrome | 02 | 01.9 |
| Joint creaking | 02 | 01.9 |
| Knee buckling | 02 | 01.9 |
| Functional impotence | | |
| Ability to get up unaided | 37 | 34.3 |
| Inability to get up unaided | 71 | 65.7 |
| Other signs | | |
| Dizziness | 18 | 16.7 |
| Fever | 12 | 11.1 |
| Paraesthesia of the limbs | 12 | 11.1 |
| Headache | 10 | 09.3 |
| Coma | 06 | 05.6 |
| Impairment of general condition | 06 | 05.6 |
| Brief loss of consciousness | 06 | 05.6 |

Continued

| | | |
|---------------------|----|------|
| Earache | 04 | 03.7 |
| Cough | 04 | 03.7 |
| Depressive syndrome | 02 | 01.9 |
| Epigastralgia | 02 | 01.9 |
| Haematemesis | 02 | 01.9 |
| Vomiting | 02 | 01.9 |
| Burning | 02 | 01.9 |
| Convulsions | 02 | 01.9 |

Table 9. Distribution of elderly patients who have fallen according to the traumatic, medical and psychological consequences.

| The consequences of the fall | Effective (n = 108) | Percentages (%) |
|---------------------------------------|----------------------------|------------------------|
| The traumatic consequences | | |
| A dislocation/sprain | 08 | 07.4 |
| Bruises/Ulcerations | 07 | 06.5 |
| A fracture | 06 | 05.6 |
| A shock | 02 | 01.9 |
| A cerebral hematoma | 01 | 00.9 |
| Medical consequences | | |
| A urinary infection | 10 | 09.3 |
| A dehydration | 09 | 08.3 |
| The psychological consequences | | |
| A fear of falling | 28 | 25.9 |
| A depression | 10 | 09.3 |

4. Discussion

The aim of this study was to collect data on falls among the elderly in Côte d'Ivoire, based on medical records. However, due to its retrospective nature, several biases need to be highlighted. Firstly, the small sample size constitutes a selection bias, limiting the representativeness of the results. In addition, patients' socio-economic conditions, which have a direct influence on treatment, are not sufficiently documented in the medical records, introducing a bias linked to these factors. Another major bias lies in the quality of the medical records themselves, which are often inadequately documented for certain essential parameters, such as the treatment being taken at the time of the fall, including dosage, compliance and duration of treatment. The lack of balance and gait assessment tests in the records, as well as the absence of bone mineral density (BMD) measurements, also complicates the analysis of risk factors. In addition, the lack of complete data on

the treatment of patients at the time of the fall limits the assessment of iatrogenicity and post-fall evolution, especially as patients living at home may be referred to other institutions, resulting in a loss of valuable data. Despite its methodological limitations, this study has provided valuable information on falls in the elderly in our context, which will help to improve their management. It also opens up a number of avenues for discussion.

Falls among the elderly are a major public health issue [2], with serious consequences in terms of morbidity, mortality, loss of independence and an increased risk of institutionalization [3]. The problem is widely recognized and documented in the literature, particularly in developed and Western countries, where geriatrics is a well-established specialty and falls have been the subject of much research. In the United States and the United Kingdom, it is estimated that falls affect around a third of people over the age of 65 each year, and are more prevalent among people living in institutions. In France, according to the 2005 Health Barometer survey, 24% of people aged 65 to 75 had fallen in the previous year. According to the 2010 edition, more than one in five people in the 55 - 85 age group (21.6%) reported having fallen in the last 12 months. The incidence in Belgium has been estimated at 2.2/1000 in women aged 65 to 74 and 12/1000 in women aged 75 to 84 [5]. In Beijing, China, Yu found a prevalence of falls of 18%. Similarly, a study in Brazil showed that 32.5% of elderly people had fallen in the previous year [6].

However, in low-income countries, particularly in Africa, the literature on falls in the elderly is still limited. This situation is particularly marked in countries where geriatrics is an emerging discipline. According to a meta-analysis of falls in Africa, the prevalence of falls varies between 11.2% and 60.3% [7]. In Ghana, the prevalence of falls in hospital patients aged 60 and over was 40.2% [11]. In Nigeria, it was 23% [12]. Two separate studies in North Africa (Egypt) recorded the highest (60.3%) and lowest (11.2%) prevalence of falls in older adults [7]. Four studies conducted in West Africa (Nigeria) showed a prevalence of falls ranging from 21% to 29%. However, in southern Africa (South Africa, Zimbabwe), the prevalence of falls among older adults was 26.4% and 14%, respectively. Malawi and Rwanda in the eastern part of Africa recorded a falling prevalence of 41% and 23%, respectively [7]. In Dakar, Senegal, Pouye reported a prevalence of 13.69% [13]. In Côte d'Ivoire, on the other hand, publications on this subject are rare. The relatively low prevalence of 14% observed in our study could be explained by the fact that, in our context, falls in the elderly are often minimized, both by those around them and by medical staff, leading to inadequate documentation in medical records [14].

Many studies have highlighted the multifactorial nature of falls in older people [3] [11] [12]. These accidents result from a complex and interactive combination of biological, medical, behavioural and environmental factors, many of which can be modified by appropriate interventions [15]. We distinguish intrinsic factors, which are specific to the individual, such as age, chronic diseases, muscle weakness, gait and balance disorders, and cognitive impairment. At the same time, ex-

trinsic factors mainly include drug use, environmental hazards and certain risk behaviours [4].

Aging itself is an important factor in the occurrence of falls. Indeed, the risk of falls increases with age [7], and numerous studies have shown that falls are more frequent among people aged 75 years and over [16]. This phenomenon is linked to a progressive loss of muscle mass (sarcopenia) and a decrease in muscle strength, which impairs the ability to maintain a stable posture and react quickly in case of loss of balance. Physical inactivity aggravates this situation by accelerating the degradation of muscle mass and strength. This muscle weakness is one of the main risk factors for falls in older adults. A 2004 meta-analysis found a positive correlation between muscle strength and risk of falls [17]. The main causes of visual deficits in tumors, classified by decreasing frequency, were: cataract (47.4%), association between cataracts and age-related macular degeneration (AMD) (17.5%), isolated AMD (13.4%) and optic neuropathy (6.2%). The management of these deficits is complex, since only 17 eyes out of 48 (35.4%) were able to benefit from a cataract operation [17].

In our series, there were 2 times more women than men. According to most literature, data report a clear predominance of falls among women and have identified the female sex as a risk factor for falls in the geriatric population [1] [5] [7] [13]. This may be due to various hormonal changes that women experience as they age, resulting in a faster reduction of bone mass than men [18]. Older women are generally more prone to falls than men, in part due to osteoporosis, which weakens bones and increases the risk of fractures if they fall. A study found that women aged 65 and over had a 1.3 times greater risk of falling than men in the same age group [19]. In addition, women are more likely to suffer serious injuries, such as hip fractures, from falls, whereas men are at increased risk of death after a fall due to more frequent comorbidities and more severe head injuries [20].

Some studies show that social isolation increases the risk of falls [21], and several studies have found a significant relationship between living alone and increased frequency of falls [1] [6]. People living alone report more falls than those living with others [4]. In addition, social isolation can also lead to involuntary or, in some cases, intentional falls in order to attract attention. This highlights the impact of psychosocial factors as potential causes of falls [4].

Balance and gait disorders, which result from the functional effects of aging and pathologies, are major indicators and essential predictors of risk of falls in older people [1] [3] [4]. Most falls occur as a result of loss of balance while walking, and poor balance is considered the main risk factor. As a result, mobility plays a central role in fall risk assessment, although many predictors are still lacking in identifying particularly vulnerable older people [22]. Yang, Australia, found that 50% of older adults had impaired balance and walking, which is a significant public health issue that impacts their quality of life [1]. Lord *et al.* have shown that the more complex postural stability tasks are, the greater the risk of falling increases, pointing out that decreased walking speed, cadence and stride length are strongly

associated with this risk [4].

On the other hand, a reduction in motor autonomy coupled with institutionalization and loss of functional autonomy also contributes to an increased risk of falls [3]. A study in Canada found that seniors with reduced mobility have an increased risk of falling, a finding corroborated by the research of Fletcher and Hirdes, which showed that individuals with reduced mobility were 1.65 times more likely to fall than those with preserved mobility [15]. The walking pattern of older people becomes more rigid, less coordinated, and postural control deteriorates. These factors, combined with decreased reflexes, muscle strength, tone, and reduced length and height of stride, impair their ability to avoid falls [1].

Other prospective studies have identified osteoarthritis as a major risk factor for falls [1] [4]. In Senegal, KA also observed a 25% prevalence of osteoarthritis [1]. In addition, symptoms such as pain and reduced range of motion in the knees and hips have been associated with an increased risk of falls [4].

Cognitive impairments such as dementia and cognitive decline, as well as psychological disorders such as depression and anxiety, are major risk factors for falls in older adults [4]. According to the literature, studies show that the incidence of falls in seniors with dementia is 8 - 10 times higher than in non-dementia patients [23]. Wright *et al.* point out that cognitive impairment is increasingly recognized as a significant contributor to the risk of falls, including executive dysfunction, while other cognitive abilities, such as memory, are less associated with falls [4]. A study conducted in Spain also showed a significant association between depression and falls, with 24.7% of depressed patients experiencing falls (OR: 1.97; 95% CI: 2.19 - 6.48), which corroborates the results of Cavanillas *et al.*, that depression is an important risk factor, especially in intrinsically-induced falls [15]. The prevalence of neurodegenerative disorders, such as Alzheimer's disease and vascular dementia, continues to increase with population growth. By 2020, an estimated 42 million people worldwide will be affected by dementia, a phenomenon that particularly affects the elderly [23].

Cardiovascular disease, a history of stroke and polypathologies significantly increase the risk of falls in older adults. In Tunisia, a study of elderly people who had experienced at least one fall in the previous year found that 60% of patients had polypathologies, with an average of three or more chronic conditions [24]. In addition, a literature review on risk factors for falls among elderly people living in community settings conducted by Bergland found that the number of chronic diseases is significantly associated with an increased risk of future falls. Indeed, frail seniors with more than one chronic illness have higher rates of falls than healthy and active seniors [4].

In the same review, recent studies have highlighted that falls are particularly common among stroke survivors, with factors such as severity of stroke, balance and mobility significantly influencing this risk [4]. Hypertension (HTA), a condition affecting 53.7% of patients, is frequently reported in studies and represents a major public health problem, especially among the elderly. This risk is often ex-

acerbated by factors such as obesity, stress and a sedentary lifestyle. A study conducted in Senegal reported a prevalence of hypertension of 52% [1], while in the Democratic Republic of the Congo, Ilunga observed a prevalence of 41.4% [5].

In addition to the non-modifiable factors of intrinsic factors and co-morbidities, extrinsic factors that are modifiable may also be involved in the mechanism of falls in the elderly [1] [3] [4] [7] [17] [24].

Falls occur primarily at home. Three clinical studies conducted in a geriatric unit, aimed at analyzing the clinical signs associated with a history of falls, have shown that elderly people who have fallen often live at home and remain active, able to perform significant physical activities, such as standing more than four hours a day or climbing stairs [25]. This observation is confirmed by a study in Dakar, Senegal, where the majority of falls occur at home (82%), mainly in the bedroom (30%), courtyard or common room (28%) and toilet (14%). Other research by Gbehi *et al.* found a lower rate of falls at home (64.29%) [13]. In New Zealand, a study showed that falls occurred mainly in the dining room (27.4%) and bedroom (21.4%), while Pitchai *et al.* found that toilets (50.75%), hallways (18.21%) and the bedroom were the most common places for falls [13]. In Egypt, a study conducted by Hamed found that more than half of people living in houses with stairs reported falls during the previous year, as did 72.8% of those living in poorly lit dwellings [26]. By contrast, a Norwegian study showed that falls are more frequent outside the home, especially among elderly women (57.5%) [13].

Urban life, while offering easy access to physical activities, exposes older adults to increased environmental risks, such as high density urban spaces and the presence of obstacles that increase the risk of falls. Conversely, living in the suburbs or rural areas has advantages for physical exercise, especially walking, which is generally easier to do than in the city [22].

Extrinsic factors, such as obstacles on the ground and slippery surfaces, are often cited as important causes of falls [1] [13] [26]. In Senegal, BA noted that 27% of the falls were caused by obstacles on the ground and 19% by slippery surfaces, including furniture, stones and irregular cobblestones, which are common elements in elderly households. Environmental disorders, along with obstacles and slippery surfaces, are also key factors in triggering falls [13]. These elements, combined with the presence of stairs, significantly increase the risk of falls, with ground obstacles accounting for 35% of the risks, slippery surfaces 16%, and stairs 9%, according to a KA study also conducted in Senegal [1]. In addition, a study conducted in Egypt found that factors such as carpet and living alone were associated with an increased frequency of falls. Approximately 47.6% of people living in houses with carpets and 64.2% of those living alone reported falls during the past 12 months [26].

Other environmental factors, such as poor lighting, are also a major risk. A study conducted in Egypt by Hamed found that poor lighting contributed to 37% of falls, with a significant impact, as 72.8% of seniors living in poorly lit homes reported falls the previous year [26].

Drugs also play an important role in increasing the risk of falls among older adults. In Egypt, a study found a significant association between drug use and falls ($p < 0.001$) [26]. Several classes of drugs, including psychotropic drugs, antihypertensives, diuretics and anticholinergics, are particularly associated with increased risk. Psychotropic drugs such as benzodiazepines, tricyclic antidepressants and antipsychotics increase this risk due to their sedative effects and impact on alertness. A systematic review has shown that benzodiazepine use increases the risk of falls in older adults by 44% [27]. Other research confirms that psychotropic drugs, including antidepressants, anxiolytics/hypnotics and antipsychotics, are associated with an increased risk of falls [26]. A meta-analysis showed that psychotropic drugs contribute significantly to the increased risk of falls and fractures, with an adjusted risk of 1.54 for sedatives and hypnotics comparable to antidepressants (1.66) [28].

Many studies confirm that the risk of falls increases when the number of medications taken is high [4] [5] [26] [28]. For example, one study found that patients taking multiple medications had almost twice the risk of falls than those using fewer drugs [29]. In Egypt, 41.5% of people on medication reported falling over the past year [26]. Polymedication creates additional risks, including side effects and drug interactions [28].

Alcohol consumption increases the risk of falls in the aging population [22]. According to a WHO global report on the prevention of falls in older adults, it was associated with an increased risk of falling among older adults. There was a 1.4 times higher risk of falling among seniors who drank on average two or more days per week than those who did not [2].

We observed that, on average, each patient had experienced 1.9 falls in the last 12 months, and 49.1% of patients experienced repeated falls. This result is comparable to that of Kechaou in Tunisia, which reported an average number of 1.6 falls per patient over the previous year, with 40% of participants experiencing repeated falls [24]. Similarly, Tsai *et al.* found that 35% of patients had repeated falls, while Buatois reported 39% in its study on the assessment of the risk of repeated falls in older adults. In contrast, in Senegal, a study conducted by KA on patients aged 60 and over found that 25% of patients had experienced repeated falls [1]. History of falls is an important indicator of frailty, reduced mobility and acute or chronic conditions [4].

Falls in the elderly are often perceived as benign, although they can have serious consequences, resulting in costly fractures and hospitalization. Approximately 85% of falls do not cause severe trauma [25], so many falls without consequences are not included in the statistical data; they are also quickly forgotten by the victims themselves in subsequent investigations [1]. This trivialization of the fall exists at all levels: the patient, the entourage, the medical practitioner and the hospital teams. However, 5% require medical consultations [25]. These falls can cause physical but also psychological repercussions [1] [5] [22] [25] [28].

In our study, falls were the most frequent reason for consultation, accounting

for 33.3% of cases, and pain was present in 50% of cases. Indeed, a meta-analysis of falls in the elderly also indicates that pain is a frequently mentioned factor [22]. However, pain management is a crucial, but often complex, step in the management of trauma in the elderly. When poorly managed, pain can lead to acute mental confusion, regressive syndromes accompanied by withdrawal, anorexia or depression. Conversely, excessive analgesia can expose elderly patients to reduced alertness, depression of the upper respiratory centers, and an increased risk of falls [13]. The immediate severity of the fall may be directly related to the event itself and depends on the immediate consequences, which vary from simple bruising to more serious trauma, such as dislocations, vertebral compression, cerebral hematomas or fractures [1]. The prevalence of fractures varies between studies. BA in Senegal reported a prevalence of 86% [13], while a Moroccan study in 2019 revealed a prevalence of 66% of fractures in elderly patients who had fallen. Kechaou in Tunisia reported a prevalence of 32.5% [24]. In the United States, Phelan *et al.* observed a prevalence of 14% [13], and Ka in Senegal reported a prevalence of 15% [1]. The prevalence of fractures observed in our series, which is significantly lower than that reported in other studies, could be due to underestimation, as the management of traumatic consequences is carried out in other departments, and these data are not systematically recorded in real time in geriatric department registers. However, fractures can increase the risk of long-term mortality, due to post-operative complications, loss of autonomy and effects on mobility [24].

In the days following a fall in an elderly person, a post-fall syndrome may occur, resulting in a reduction in activities, a loss of physical autonomy and psychological problems [30]. These psychological consequences include fear of falling, loss of self-efficacy, avoidance of activities and the development of a depressive syndrome [24] [26]. Although these psychological consequences are equally important, they are often more difficult to assess. In our series, 25.9% of patients reported a fear of falling. In Tunisia, Kechaou observed a higher prevalence of 57.5% [24]. Other studies indicate that this prevalence varies between 3% and 85%, including in around 50% of elderly people who have not suffered a fall. The main risk factor for fear of falling is having already experienced a fall [31].

Fall phobia in the elderly generally occurs after a real or perceived fall, and can lead to avoidance of walking, resulting in a reduction in the distance walked, or even a refusal to walk, sometimes accompanied by psychopathological complications [1]. Moreover, this prevalence is higher in women than in men, and increases with age [31].

Similarly, depression is often associated with post-fall syndrome in the literature [1] [22] [31]. Some authors report that it affects up to 39% of elderly people who suffer falls [1]. Depression has also been identified as a risk factor for falls [32]. Moreover, the fear of falling can intensify depression [22] [32].

Preventing falls in the elderly should begin with regular risk assessment during medical consultations, using screening questionnaires and functional tests. It is vital to take action on modifiable factors, such as adapting the home and reviewing

medication, particularly those that have an impact on the central nervous system. As for non-modifiable factors, programmes to improve physical strength and balance, combined with nutritional interventions and osteoporosis management, are effective measures for reducing the risk of falls. It is also necessary to manage the fear of falling using non-medicinal approaches. Finally, certain pathological disorders, such as cognitive deficits, visual problems or orthostatic hypotension, need to be treated [33].

In our context, where geriatrics is still in its infancy, as in other countries in the sub-region, the management of falls in the elderly is still in its early stages [34]. In Côte d'Ivoire, the Angré University Hospital, is currently the only relatively recent public centre specialising in this field. As geriatrics is not yet a widespread specialty, prevention and management measures are still being put in place.

5. Conclusion

Falls among the elderly represent a public health challenge because of their severe consequences for physical health and independence. Several risk factors, such as age, chronic illness, sarcopenia and visual impairment, as well as social and environmental factors, play a major role in the occurrence of falls. While some factors, such as age, are inevitable, others, such as living conditions and social isolation, can be modified. Repeated falls particularly affect people's mobility and independence, leading to serious physical consequences such as fractures, as well as psychological problems such as the fear of falling. This phenomenon creates a vicious circle that exacerbates the loss of mobility and the deterioration in quality of life, while increasing the risk of mortality, particularly from serious injuries such as hip fractures. This highlights the importance of implementing targeted prevention strategies, ensuring prompt medical attention and improving the environment in which elderly people live in order to limit the risks and promote their quality of life.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

- [1] Ka, O. (2019) The Determinants of Fall in the Elderly at the Geriatric Center of Ouakam (Senegal). *World Journal of Public Health*, **4**, 24-29. <https://doi.org/10.11648/j.wjph.20190401.14>
- [2] World Health Organization (2007) Global Report on Falls Prevention in Older Age. <https://www.who.int>
- [3] Bloch, F., Thibaud, M., Dugué, B., Brèque, C., Rigaud, A. and Kemoun, G. (2010) Episodes of Falling among Elderly People: A Systematic Review and Meta-Analysis of Social and Demographic Pre-Disposing Characteristics. *Clinics*, **65**, 895-903. <https://doi.org/10.1590/s1807-59322010000900013>
- [4] Bergland, A. (2012) Fall Risk Factors in Community-Dwelling Elderly People. *Norsk Epidemiologi*, **22**, 151-164. <https://doi.org/10.5324/nje.v22i2.1561>
- [5] Ilunga-Ilunga, F., Muasapatoka, G.K., Nkashama, J.M., Kandolo, F.T., Muya, J.P.M.

- and Kabulo, P.K. (2022) Falls in the Elderly: Prevalence and Explanatory Factors in Kinshasa: Democratic Republic of Congo. *International Journal of Paediatrics and Geriatrics*, **5**, 70-75. <https://doi.org/10.33545/26643685.2022.v5.i1b.169>
- [6] Siqueira, F.V., Facchini, L.A., Silveira, D.S.D., Piccini, R.X., Tomasi, E., Thumé, E., *et al.* (2011) Prevalence of Falls in Elderly in Brazil: A Countrywide Analysis. *Cadernos de Saúde Pública*, **27**, 1819-1826. <https://doi.org/10.1590/s0102-311x2011000900015>
- [7] Addai-Dansoh, S., Nutakor, J.A., Larnyo, E., Arboh, F., Boahemaa, P.Y. and Osei-Kwakye, J. (2022) Prevalence of Falls among Older Adults in Africa: A Meta-Analysis. *International Journal of Scientific Research in Science and Technology*, **9**, 262-269. <https://doi.org/10.32628/ijrst229537>
- [8] Hars, M. and Trombetti, A. (2013) Evaluation de la marche, de l'équilibre et du muscle chez le sujet âgé. *Revue Médicale Suisse*, **9**, 1265-1271. <https://doi.org/10.53738/revmed.2013.9.390.1265>
- [9] MacDermid, J.C., Wessel, J., Humphrey, R., Ross, D. and Roth, J.H. (2007) Validity of Self-Report Measures of Pain and Disability for Persons Who Have Undergone Arthroplasty for Osteoarthritis of the Carpometacarpal Joint of the Hand. *Osteoarthritis and Cartilage*, **15**, 524-530. <https://doi.org/10.1016/j.joca.2006.10.018>
- [10] Kanis, J.A., McCloskey, E.V., Johansson, H., Oden, A. and Leslie, W.D. (2010) Development and Use of the FRAX® Algorithm for the Assessment of Fracture Risk. *Osteoporosis International*, **21**, 479-493. <https://doi.org/10.1007/s00198-010-1501-9>
- [11] Adanusa, M., Pobee, S.K., Zaabaar, E., Mawuko, V., Asiedu, K., Amuzu, S.K., *et al.* (2022) Prevalence and Risk Factors for Falls among Older Adults in a Primary Care Facility in Ghana. *Malawi Medical Journal*, **34**, 225-230. <https://doi.org/10.4314/mmj.v34i4.1>
- [12] Bekibele, C.O. and Gureje, O. (2009) Fall Incidence in a Population of Elderly Persons in Nigeria. *Gerontology*, **56**, 278-283. <https://doi.org/10.1159/000236327>
- [13] Bâ, M., Sall, A., Tienin, B.P., Djajheté, R., Diouf, S.N., Bâ, D., *et al.* (2023) Assessment of Falls among the Elderly in the Emergency Department of the Idrissa Pouye General Hospital in Dakar, Senegal: A Cohort of 100 Cases. *Journal of Biosciences and Medicines*, **11**, 12-26. <https://doi.org/10.4236/jbm.2023.1112002>
- [14] National Safety Council (2023) Older Adult Fall. <https://injuryfacts.nsc.org/home-and-community/safety-topics/older-adult-falls/>
- [15] Kamel, M.H., Abdulmajeed, A.A. and Ismail, S.E. (2013) Risk Factors of Falls among Elderly Living in Urban Suez—Egypt. *Pan African Medical Journal*, **2**, Article 26. <https://doi.org/10.11604/pamj.2013.14.26.1609>
- [16] Chen, S., Jin, X., Li, F., Zhang, Q. and Zhang, B. (2022) The Incidence and Risk Factors of Falls in Elderly People: A Systematic Review and Meta-Analysis. *Frontiers in Public Health*, **10**, Article 878719.
- [17] Yeung, S.S.Y., Reijnierse, E.M., Pham, V.K., Trappenburg, M.C., Lim, W.K., Meskers, C.G.M., *et al.* (2019) Sarcopenia and Its Association with Falls and Fractures in Older Adults: A Systematic Review and Meta-Analysis. *Journal of Cachexia, Sarcopenia and Muscle*, **10**, 485-500. <https://doi.org/10.1002/jcsm.12411>
- [18] Stolt, M., Routasalo, P., Suhonen, R. and Leino-Kilpi, H. (2020) Falls among Older Adults: A Systematic Review. *Journal of Clinical Nursing*, **29**, 206-217.
- [19] Tinetti, M.E., Speechley, M. and Ginter, S.F. (1988) Risk Factors for Falls among Elderly Persons Living in the Community. *New England Journal of Medicine*, **319**, 1701-1707. <https://doi.org/10.1056/nejm198812293192604>
- [20] Stevens, J.A. and Sogolow, E.D. (2005) Gender Differences for Non-Fatal Uninten-

- tional Fall Related Injuries among Older Adults. *Injury Prevention*, **11**, 115-119. <https://doi.org/10.1136/ip.2004.005835>
- [21] Demeocq, T. (2012) Chute du sujet âgé: prévalence et parcours de soins en médecine générale: Une étude transversale déclarative multicentrique. Master's Thesis, Joseph Fourier University.
- [22] Xu, Q., Ou, X. and Li, J. (2022) The Risk of Falls among the Aging Population: A Systematic Review and Meta-Analysis. *Frontiers in Public Health*, **10**, Article 902599. <https://doi.org/10.3389/fpubh.2022.902599>
- [23] Allan, L.M., Ballard, C.G., Rowan, E.N. and Kenny, R.A. (2009) Incidence and Prediction of Falls in Dementia: A Prospective Study in Older People. *PLOS ONE*, **4**, e5521. <https://doi.org/10.1371/journal.pone.0005521>
- [24] Kechaou, I., Cherif, E., Sana, B.S., Boukhris, I. and Hassine, L.B. (2019) Complications traumatiques et psychosociales des chutes chez le sujet âgé tunisien. *Pan African Medical Journal*, **32**, Article 92. <https://doi.org/10.11604/pamj.2019.32.92.16667>
- [25] Auvinet, B., Berrut, G., Touzard, C., Moutel, L., Collet, N. and Chaleil, D. (2002) Falls in the Elderly: The Need for Teamwork through a Network. *Revue Médicale de l'Assurance Maladie*, **33**, 183-191.
- [26] Hamed, A.F., Mohammed, N.A. and Aly, H. (2017) Elderly Falls Prevalence and Associated Factors in Sohag Governorate. *The Egyptian Journal of Community Medicine*, **35**, 1-13.
- [27] Woolcott, J.C. (2009) Meta-Analysis of the Impact of 9 Medication Classes on Falls in Elderly Persons. *Archives of Internal Medicine*, **169**, 1952-1960. <https://doi.org/10.1001/archinternmed.2009.357>
- [28] Loew, F., Loew et, F. and Maupetit, C. (2005) Prévenir les chutes et les fractures aujourd'hui. *Revue Médicale Suisse*, **1**, 781-784. <https://doi.org/10.53738/revmed.2005.1.11.0781>
- [29] Dhalwani, N.N., Fahami, R., Sathanapally, H., Seidu, S., Davies, M.J. and Khunti, K. (2017) Association between Polypharmacy and Falls in Older Adults: A Longitudinal Study from England. *BMJ Open*, **7**, e016358. <https://doi.org/10.1136/bmjopen-2017-016358>
- [30] Nkodo Mekongo, Y. P., De Breucker, S., Delvaux, N., and Pepersack, T. (2007). La peur de chuter et le "syndrome post-chute" de la personne âgée. *Revue médicale de Bruxelles*, **28**, 27-31.
- [31] Scheffer, A.C., Schuurmans, M.J., van Dijk, N., van der Hooft, T. and de Rooij, S.E. (2008) Fear of Falling: Measurement Strategy, Prevalence, Risk Factors and Consequences among Older Persons. *Age and Ageing*, **37**, 19-24. <https://doi.org/10.1093/ageing/afm169>
- [32] Shao, L., Shi, Y., Xie, X., Wang, Z., Wang, Z. and Zhang, J. (2023) Incidence and Risk Factors of Falls among Older People in Nursing Homes: Systematic Review and Meta-analysis. *Journal of the American Medical Directors Association*, **24**, 1708-1717. <https://doi.org/10.1016/j.jamda.2023.06.002>
- [33] Münzer, T. and Gnädinger, M. (2014) Evaluation du risque de chute et prévention des chutes au cabinet du médecin de famille. *Forum Médical Suisse—Swiss Medical Forum*, **14**, 857-861. <https://doi.org/10.4414/fms.2014.02109>
- [34] Obi, P., Nwankwo, H., Emofe, D., Adandom, I. and Kalu, M. (2019) The Experience and Perception of Physiotherapists in Nigeria Re: Fall Prevention in Recurrent-Faller Older Adults. *Internet Journal of Allied Health Sciences and Practice*, **17**, Article 11. <https://doi.org/10.46743/1540-580x/2019.1798>