Epidemiology of falls in a geriatric ward: rationale for a quality program

LOEW, François, et al.
Management of Aging
The University of Geneva Experience

Editors
J.-P. Michel
P.R. Hof
Epidemiology of Falls in a Geriatric Ward: Rationale for a Quality Program

François Loew¹, Yvette Regeste-Rameau², Reto Kressig³, Didier Marcant⁴, François R. Herrmann⁵, Jean-Pierre Michel⁶

¹ Polyclinic of Geriatrics, ² Geriatric Hospital, and ³ Center for Continuing Care, University Hospitals of Geneva, Switzerland

Introduction

Falls are a major problem in old age. They are a frequent cause of hospital admission and their morbidity includes potentially severe injuries with fractures in 3–6% of cases [1–3], pain, loss of functional independence and institutionalization [4]. A fracture of the proximal femur may have poor functional recovery, a 1-year mortality of about 25% and the cost of a hospital stay is about 44,000 USD [5]. Falls are more prevalent in the female population and are multiple in about half of the cases. Their incidence, which increases with age, is about 35% at the age of 75 and over. The epidemiology of falls has been well established both in the community [1–3, 6] and in nursing homes [7]. However, falls in acute care and rehabilitation settings have still received little attention [8–14]. Risk factors for falls in hospital settings are disorientation, psychotropic drug use, evidence of stroke, difficulties in the Up-and-Go Test [11], a history of falls, confusion and dependence in activities of elimination [13].

The consequences of falls in hospital are hematomas, bruises and lacerations in about 50% of cases, and fractures in 3–6% of cases [8–10]. In addition to other consequences such as pain and fear of falling again, the quality of life of such patients is certainly deteriorated: patients and families generally consider the hospital as safe in comparison with home. Moreover, the length of stay of patients having suffered one or several falls is likely to increase, with additional costs [9]. Finally, the responsibility of the hospital may be engaged [12]. A recent case of femoral neck fracture in a Swiss hospital was in litigation.

Consequently, recommendations of preventive measures were made by the Swiss Group of Geriatricians [Chapuis Ch, submitted].

Due to the morbidity of falls in hospital and to their impact on patients’ quality of life, a specific management and prevention program should be made during the hospital stay of older patients. In a quality of care step, falls should be prevented as well as nosocomial infections [15, 16]. However, two important preliminary questions remain open: firstly, is prevention of falls and injuries in hospital possible, and which are the modifiable risk factors? Secondly, is it possible to reduce the severity of injuries due to falls?

Only scarce data are available about the efficacy of fall prevention in hospital [15–17]. Several potential obstacles to prevention in wards should be mentioned. The term ‘accidental falls’ itself calls to mind that falls are pure ‘accidents’ and chance. On the other hand, the term ‘multifactorial’ adequately describes the association of several risk factors for falls to polymorbidity, complexity, chronic diseases and functional incapacity, but these risk factors will probably be seen a priori as poorly modifiable. The everyday experience of falls in wards is likely to make them trivial and normal. Young doctors are often more prone to search for the acute origin of a fall, such as arrhythmia, hypotension or a transient ischemic attack, than to look at chronic risk factors. The proportion of syncopal falls, due to an acute intrinsic event, is probably <5% compared to chronic risk factors in our experience.

It was recently shown that a multifactorial intervention in the community with the FICSIT trials [18–21] and in nursing homes [22] was able to significantly reduce the incidence of falls. As regards falls in hospital, all major criteria for prevention are present, i.e., a high frequency, the evidence of preventability and considerable morbidity: It is therefore logical to assume that prevention in geriatric wards is both feasible and efficient, even during a short stay. The basic conditions are that circumstances of falls should be identified and the intervention be directed on individual intrinsic, behavioral and environmental risk factors [21].

In the following section, we describe the interdisciplinary experience of the quality program made in two geriatric and rehabilitation hospitals. The Geriatric Hospital with 304 beds and the Center for Continuing Care with 104 beds are teaching hospitals belonging to the University Hospitals of Geneva.

Methods

The rationale for the interdisciplinary project of quality ‘falls and functional rehabilitation’ was based on four points: (1) falls in hospital identified as a specific geriatric entity need a specific approach; (2) the legal responsibility of the hospital regarding injuries caused
by falls or other accidental events may be engaged [12]; (3) falls as markers of frailty and polymorbidity require adequate management, and (4) there is recent evidence that a multifactorial preventive approach acting on modifiable risk factors for falls is both feasible and efficient [18–21].

The project was built up by geriatricians, research nurses, physical therapists and occupational therapists, who were previously associated in an interdisciplinary 'fall consultation'. The main objectives were improving the professionals' knowledge of the phenomenon of falls, setting up a specific assessment and functional rehabilitation process, and setting up a hospital-based preventive strategy.

The quality of the database of accident recordings was the cornerstone of the project. For several years, a thoroughly detailed accident report form, which had been introduced a long time ago, was found to be unsatisfactory. In numerous instances, a fall was considered as a simple ‘incident’, and as such, not recorded through the accident report form. In addition, in most cases, only inconsistent rehabilitative or preventive decisions were elicited in the ward by a fall or by a patient at high risk for falls. The accident report form, seen rather as a useless duty than as a potential preventive tool, was incompletely filled out in most instances. In other words, there was a considerable gap between the recording of a fall or the identification of a patient at high risk for falls, and the necessary rehabilitation and prevention measures based on modifiable risk factors. In this respect, a consistent and reliable database seemed of utmost importance for measuring the baseline fall and injury rate in hospital and the possible impact of a preventive intervention. A new accident report form which included all types of accidents (falls, direct blow, burns, accidental ingestion, etc.) was consequently created, with the following criteria: the form had to be easy and quick to use by health professionals for every fall or other accident liable to occur in the wards. It had to yield pertinent information regarding the legal and responsibility aspects of the accidental event. It had to enhance the health professionals' understanding of the mechanisms involved and to favor further prevention. In the following section, only fall accidents (98.4% of all accidents in the wards) will be taken into consideration.

Particular emphasis was given to the fall location, the time, the associated circumstances, possible symptoms and activities immediately preceding the fall. A search for symptoms associated with a fall is known to be poor immediately after a fall. However, it seemed important to systematically ask the patient about symptoms for diagnostic purposes.

Among psychotropic drugs, which are known risk factors for falls and hip fracture [1–3, 23, 24], long-acting benzodiazepines have long been out of use in our geriatric settings. However, shorter-acting benzodiazepines, other tranquilizers, neuroleptics and antidepressants are still widely used, despite restrictive policy about their use in older patients. All these drugs may decrease alertness and postural stability and increase the risk of falls [24–26], depending of the doses, time of administration and individual response. A detailed recording of each psychotropic drug regimen would be clearly unfeasible by health professionals without specific training. That is why the recording of any psychotropic drug use in the last 24h was finally chosen, independently of the pharmacological class and the drug regimen. Diuretics, vasodilators and antihypertensive agents were also recorded, despite conflicting results about their role as risk factors for falls [27, 28]. Different types of consequences of falls had to be recorded: pain, bruises, hematomas, lacerations, luxation and fractures. Finally, the accident report form which contains a question about the possible responsibility of the ward or the institution, considered from the health professional point of view, had to be filled jointly by the nurse in charge of the patient and the resident.

Fig. 1. Times when falls occurred.

Results

The data were collected over a full 24-months period during 1996 and 1997. Among 2,019 accidents registered in both hospital settings, 1,987 (98.4%) were falls. The fall rate was 30% admitted patient, alternatively 6.8 falls/1,000 bed days. The mean age of the patients who suffered a fall was 83.1 ± 6.9 years for males and 84.6 ± 7.3 years for females (67.7% of the fallers).

There was no significant variation in the fall rate over the 12-month period. However, characteristic changes over the 24-hour period were found (fig. 1): Two periods of increased frequency of falls were registered, i.e. between 9 and 11 a.m. and between 1 and 7 p.m., corresponding with periods of increased activities in the wards. The lowest fall figures were found at the beginning of the night, followed by a small 'peak' around 11 p.m., followed by a progressive increase up to the morning. Thirty-nine percent of all falls happened between 7 p.m. and 7 a.m. Most falls (66%) occurred in the patient's room (table 1). Other frequent fall locations were the hallway and toilets.

Standing up (from bed, from chair, from armchair) was the most frequent activity (about one third of the cases) associated with falls (table 2). Walking came in second rank (24.5% of the cases). It is interesting to note that a majority of falls implied a minimal risk taking. These findings should be kept in mind with regard to rehabilitation and prevention in wards.

Although over 40% of falls have no sequelae (table 3), they resulted in pain in 30% of cases, lacerations, bruises, abrasions and hematomas in about half of cases. Fifty fractures (2.5% of cases) were registered, and among them one third was a fracture of the proximal femur.
Table 1. Place of falls in hospital

<table>
<thead>
<tr>
<th>Place of the fall</th>
<th>Number of falls</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bedroom</td>
<td>1,237</td>
<td>66.1</td>
</tr>
<tr>
<td>Corridor</td>
<td>245</td>
<td>13.1</td>
</tr>
<tr>
<td>Toilets</td>
<td>186</td>
<td>9.9</td>
</tr>
<tr>
<td>Dining room</td>
<td>98</td>
<td>5.2</td>
</tr>
<tr>
<td>Cafeteria</td>
<td>5</td>
<td>0.3</td>
</tr>
<tr>
<td>Others</td>
<td>100</td>
<td>5.4</td>
</tr>
<tr>
<td>Total</td>
<td>1,871</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Most falls occurred in patient rooms followed by corridors and toilets, all in the proximity of patient rooms. Falls in dining room or cafeteria or other places in the hospital were rare events. Information was missing in 116 cases.

Table 2. Type of activity during or immediately before the fall

<table>
<thead>
<tr>
<th>Activity</th>
<th>Number of falls</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standing up</td>
<td>632</td>
<td>31.8</td>
</tr>
<tr>
<td>Walking</td>
<td>487</td>
<td>24.5</td>
</tr>
<tr>
<td>Fall from the bed</td>
<td>316</td>
<td>15.9</td>
</tr>
<tr>
<td>Fall from the chair</td>
<td>232</td>
<td>11.7</td>
</tr>
<tr>
<td>Standing</td>
<td>154</td>
<td>7.8</td>
</tr>
<tr>
<td>Transferring</td>
<td>88</td>
<td>4.4</td>
</tr>
<tr>
<td>Others</td>
<td>78</td>
<td>3.9</td>
</tr>
<tr>
<td>Total</td>
<td>1,987</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Standing up was the most frequent activity associated with falls (about one third of cases), followed by walking (one quarter of cases). About one third of falls occurred during simple transfer activities (transferring, falling from bed, falling from chair).

The use of any psychotropic drug during the last 24 h before the fall was found in 49.6% of the patients having suffered a fall.

The majority of falls (n = 1,237, 62.2%) were multiple falls. Patients with multiple falls during their hospital stay did not differ statistically from patients with one fall, either by age or gender, or by use of psychotropic drugs, diuretics, vasodilators or antihypertensive agents.

In summary, falls in hospitals were likely to occur in patients' rooms, in the morning and in the afternoon during busy periods in the wards, and during simple activity such as standing up. Psychotropic drug use was frequently involved. Fractures and other severe injuries were relatively uncommon.

Table 3. Morbidity of the falls

<table>
<thead>
<tr>
<th>Consequences</th>
<th>Number</th>
<th>% of the falls</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>853</td>
<td>42.9</td>
</tr>
<tr>
<td>Pain</td>
<td>595</td>
<td>29.9</td>
</tr>
<tr>
<td>Bruises</td>
<td>249</td>
<td>12.5</td>
</tr>
<tr>
<td>Lacerations</td>
<td>247</td>
<td>12.4</td>
</tr>
<tr>
<td>Hematomas</td>
<td>242</td>
<td>12.2</td>
</tr>
<tr>
<td>Abrasions</td>
<td>221</td>
<td>11.1</td>
</tr>
<tr>
<td>Fractures</td>
<td>50</td>
<td>2.5</td>
</tr>
<tr>
<td>Others</td>
<td>93</td>
<td>4.7</td>
</tr>
<tr>
<td>Total</td>
<td>2,550</td>
<td>128.2%</td>
</tr>
</tbody>
</table>

Minor injuries were found in almost half cases and fractures in 2.5% of cases, whereas over 40% of falls had no consequences. Each fall could result in more than one consequence in some cases.

Discussion and Perspectives

A better knowledge of the epidemiology of falls was the first step of our project. The fall rate of 2.4 per bed and per year is in the same range as that which has been previously reported elsewhere [9, 10, 14]. Two thirds of falls occurred in the patient's room, a finding similar to previous results [10, 12]. Falls were observed during periods of maximal activity in the wards. Similar figures were found in a geriatric department [8]. Falls were frequently associated with simple activity such as standing up from beds or chairs, according to other findings [9, 14]. These findings suggest that functional risk factors (difficulty in standing up, balance and gait problems), possibly sensory and cognitive deficits were most implicated [11, 13]. One should mention the likelihood of hospitalization-related factors, with orthostatic hypotension, deconditioning, malnutrition, iatrogenic factors and sensory deprivation [14, 29]. Specific rehabilitation programs and adequate proteocaloric intake should be applied to high-risk inpatients [14, 15, 19-21].

About half of the patients having suffered one or more falls were taking psychotropic drugs. Education efforts are therefore particularly needed for doctors, patients and nursing staff [17, 21, 22, 25]. The current practice of
prescribing, e.g., customary 15 mg of oxazepam at night because of discomfort of the hospital surrounding should be avoided.

Intervening on activity-related risk factors for falls requires a preliminary feasibility study by an interdisciplinary team [22]. The fact that the majority of falls occurred during the period of maximal activity in the wards strongly suggests that mobility itself is a risk factor for falls [21]. However, it would be clearly erroneous to restrict the activities and mobility of patients [14]. A preliminary evaluation of high-risk patients should avoid deconditioning and stimulate improving their risk perception and their mobility [15, 16]. Environmental risk factors have generally been adequately reduced in geriatric and rehabilitation hospitals. Innovative techniques such as anti-slide or motion-detecting carpets should be studied.

Fractures were relatively rare events in our series, compared to a rate of 3–5% of falls found in nursing homes [7]. One explanation might be that all falls which occurred in the wards were registered during the 2-year period, which was possibly not the case in nursing homes. Apart from the already mentioned prevention and treatment of osteoporosis, hip protectors might be another possibility, but its feasibility in a hospital setting seems questionable. On the other hand, physical restraint, a risk factor for severe traumas should be strictly limited to selected patients, and for a limited time during the day [11, 30].

The morbidity of falls in both hospitals does not differ consistently from that of falls occurring in the community or in nursing homes [1–3, 6, 7]. Severe injuries such as fractures are relatively rare events. However, the impact of falls and traumas on the patients’ quality of life, their potentially legal implications and their cost should prompt health professionals to control and prevent them, in the same manner as nosocomial infections [15, 16].

At the individual level, the accident report form allowed in some cases the identification of modifiable risk factors such as mobility problems. The research nurse in charge of the program could intervene in the ward and stimulate an individualized preventive strategy. Nursing assessment and safety recommendations were made about transferring, mobility and other situation factors. Statistical work up of the database yielded precise figures on the number of falls during the period of maximal activity in the wards strongly suggests that mobility itself is a risk factor for falls [21]. However, it would be clearly erroneous to restrict the activities and mobility of patients [14]. A preliminary evaluation of high-risk patients should avoid deconditioning and stimulate improving their risk perception and their mobility [15, 16]. Environmental risk factors have generally been adequately reduced in geriatric and rehabilitation hospitals. Innovative techniques such as anti-slide or motion-detecting carpets should be studied.

Intervening on activity-related risk factors for falls requires a preliminary feasibility study by an interdisciplinary team [22]. The fact that the majority of falls occurred during the period of maximal activity in the wards strongly suggests that mobility itself is a risk factor for falls [21]. However, it would be clearly erroneous to restrict the activities and mobility of patients [14]. A preliminary evaluation of high-risk patients should avoid deconditioning and stimulate improving their risk perception and their mobility [15, 16]. Environmental risk factors have generally been adequately reduced in geriatric and rehabilitation hospitals. Innovative techniques such as anti-slide or motion-detecting carpets should be studied.

Fractures were relatively rare events in our series, compared to a rate of 3–5% of falls found in nursing homes [7]. One explanation might be that all falls which occurred in the wards were registered during the 2-year period, which was possibly not the case in nursing homes. Apart from the already mentioned prevention and treatment of osteoporosis, hip protectors might be another possibility, but its feasibility in a hospital setting seems questionable. On the other hand, physical restraint, a risk factor for severe traumas should be strictly limited to selected patients, and for a limited time during the day [11, 30].

The morbidity of falls in both hospitals does not differ consistently from that of falls occurring in the community or in nursing homes [1–3, 6, 7]. Severe injuries such as fractures are relatively rare events. However, the impact of falls and traumas on the patients’ quality of life, their potentially legal implications and their cost should prompt health professionals to control and prevent them, in the same manner as nosocomial infections [15, 16].

At the individual level, the accident report form allowed in some cases the identification of modifiable risk factors such as mobility problems. The research nurse in charge of the program could intervene in the ward and stimulate an individualized preventive strategy. Nursing assessment and safety recommendations were made about transferring, mobility and other situation factors. Statistical work up of the database yielded precise figures on the number of falls during the period of maximal activity in the wards strongly suggests that mobility itself is a risk factor for falls [21]. However, it would be clearly erroneous to restrict the activities and mobility of patients [14]. A preliminary evaluation of high-risk patients should avoid deconditioning and stimulate improving their risk perception and their mobility [15, 16]. Environmental risk factors have generally been adequately reduced in geriatric and rehabilitation hospitals. Innovative techniques such as anti-slide or motion-detecting carpets should be studied.

Fractures were relatively rare events in our series, compared to a rate of 3–5% of falls found in nursing homes [7]. One explanation might be that all falls which occurred in the wards were registered during the 2-year period, which was possibly not the case in nursing homes. Apart from the already mentioned prevention and treatment of osteoporosis, hip protectors might be another possibility, but its feasibility in a hospital setting seems questionable. On the other hand, physical restraint, a risk factor for severe traumas should be strictly limited to selected patients, and for a limited time during the day [11, 30].

The morbidity of falls in both hospitals does not differ consistently from that of falls occurring in the community or in nursing homes [1–3, 6, 7]. Severe injuries such as fractures are relatively rare events. However, the impact of falls and traumas on the patients’ quality of life, their potentially legal implications and their cost should prompt health professionals to control and prevent them, in the same manner as nosocomial infections [15, 16].

At the individual level, the accident report form allowed in some cases the identification of modifiable risk factors such as mobility problems. The research nurse in charge of the program could intervene in the ward and stimulate an individualized preventive strategy. Nursing assessment and safety recommendations were made about transferring, mobility and other situation factors. Statistical work up of the database yielded precise figures on the number and types of accidents, their locations, the timing of events and the circumstances and activities before the falls. These findings may have several practical implications about work schedules in the wards, places and activities at higher risk, particularly environmental factors such as lighting and state of the floor [11]. Comparison with control patients, and better demographic characterization of the population will add interesting understanding of the faller population.

The quality program stimulated new management of patients suffering from or at high risk for falls. The nursing teams hereafter identify patients at high risk of falls and injuries through the nursing care process and the use of a risk checklist. A functional assessment tool was recently introduced in both hospitals (Independence Functional Measure) [31]. Cross-linking of this tool with the database should allow better definition of functional, cognitive and other impairments associated with falls in hospital.

At the medical level, psychotropic drug prescription is consistently and critically reviewed. Screening for osteoporosis, a potentially modifiable risk factor for fractures is applied to every referred patient who, in case of positive results, will be treated. Albuminemia and nutritional status are taken into account. Diagnostic guidelines for evaluation of falls are being set out. Rehabilitation techniques specifically adapted to patients in hospital are under investigation. Environmental factors are also considered: anti-slide carpets in patients’ rooms will be tested. Finally, the quality program in hospital is intended to be linked to the Accidents and Injuries Prevention Network in the Community recently set up in the Canton of Geneva.

In conclusion, rehabilitation and prevention of falls in hospitals seem both feasible and mandatory through an interdisciplinary collaboration. Demonstration of its preventive efficacy is still to be made, but its potential benefits as regards safety and quality of life of our inpatients clearly outweigh the efforts to be made.

References


Dr. François Loew, POLIGER, 35, rue des Bains, CH–1205 Geneva (Switzerland)
E-Mail francois.loew@hecuge.ch