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Assessing the prevalence of modifiable risk factors in older patients visiting an ED due to a fall using the CAREFALL Triage Instrument[☆, ☆☆]

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ABSTRACT

Objective Falls in older people are a common presenting complaint. Knowledge of modifiable risk factors may lead to a more tailored approach to prevent recurrent falls and/or fractures. We investigated prevalence of 8 modifiable risk factors for recurrent falling and/or a serious consequence of the fall among older patients visiting the emergency department after a fall with the Combined Amsterdam and Rotterdam Evaluation of Falls Triage Instrument (CTI), a self-administered questionnaire that consists of questions concerning demographics, possible cause(s) of the fall, and questions relating to (modifiable) risk factors for falling.

Methods After treatment for their injuries, 1077 consecutive patients 65 years or older visiting the accident and emergency department due to a fall were evaluated by the CTI. The following were assessed: impaired vision, mobility disorder, fear of falling, mood disorder, high risk of osteoporosis, orthostatic hypotension, incontinence, and polypharmacy.

Results The percentage of respondents who returned the questionnaire was 59.3%. The mean (SD) age was 78.5 (7.5) years, and 57.8% experienced a fall with serious consequences. There were 60.9% of patients with a recurrent fall versus 51% with a first fall who experienced with a serious consequence (P = .025). Age and risk factors mobility disorder (odds ratio [OR], 1.9; 95%

confidence interval [CI], 1.1-3.3), high risk of osteoporosis (OR, 2.0; 95% CI, 1.2-3.2), incontinence (OR, 1.7; 95% CI, 1.0-2.7), fear of falling (OR, 2.2; 95% CI, 1.3-3.7), and orthostatic hypotension (OR, 2.4; 95% CI, 1.4-4.2) were independently associated with a recurrent fall. Age and high risk of osteoporosis were the only risk factors predicting a serious consequence of a fall (OR, 4.6; 95% CI, 2.9-7.2).

Conclusions Age and 5 modifiable risk factors assessed with the CTI were independently associated with a recurrent fall. Only high risk of osteoporosis was associated with a serious consequence.

1. INTRODUCTION

Falls are a common presenting complaint and are among the most common and serious threats to older people. Falling is associated with considerable morbidity, reduced functioning, premature nursing home admissions, and even mortality [1], [2], [3] and [4]. The annual risk of dying from a fall for persons of ages between 55 and 64 years is 4.4 persons for every 100 000 inhabitants. This rate increases to 150 persons a year for every 100 000 persons in the group of people 75 years and older [4]. The combination of high incidence of falling and a high susceptibility to injury poses a high risk to older persons. This susceptibility to injury stems from a high prevalence of comorbid diseases and age-related physiological deterioration that makes even a relatively mild fall potentially dangerous [5] and [6].

Many patients with an injury resulting from a fall present to the accident and emergency (A&E) department. The emergency department (ED) is a busy, dynamic, and large-volume service, in which time for detailed history taking is scarce. After a fall, medical personnel usually focus on the resulting injury with little systematic assessment of the underlying cause and the effect on functional status and without recognizing possibilities for future prevention. Therefore, potential modifiable causes and risk factors for (recurrent) falls are often overlooked and may persist after treatment of the injury, resulting in a high risk of a recurrent fall [2].

Falls generally result from an interaction of intrinsic and extrinsic factors [5] and [7]. Randomized, controlled trials have presented recommendations for multifactorial interventions, mainly focused on preventable causes and modifiable risk factors. These interventions, offered through a systematic interdisciplinary approach, can significantly decrease the risk of further falls and limit the degree of functional impairment for high-risk persons [8], [9] and [10]. Knowledge of modifiable risk factors may therefore lead to a more efficient and tailored approach of a multifactor intervention. However, the selection of patients who will most likely benefit from such a multifactor intervention is not easy because the persons presenting with a fall are very heterogeneous. In addition, older persons are often unaware of their risks of falling and neither recognize risk factors nor report these issues to their physicians, especially in a busy A&E department [11]. In addition, the number of modifiable risk factors present in the high-risk population of (individual) older patients visiting the A&E department due to a fall is unknown.

The primary aim of the current study was therefore to investigate the number of literature-based modifiable risk factors present in older patients visiting the A&E department after a fall. In addition, we were interested in 2 concomitant aspects: to study whether there are differences in the prevalence and per patient burden and/or kind of modifiable risk factors between patients presenting with a first fall and patients with a recurrent fall and between patients with mild and serious consequences of the fall. By achieving these goals, we hope to be able to derive a clinical prediction guide that can eventually be used to identify the patients most in need of multifactor interventions.

2. MATERIALS AND METHODS

The study is a prospective cohort study among all patients 65 years or older, presenting after a fall at the A&E department of the Academic Medical Center in Amsterdam (AMC), a 1024-bed tertiary university-teaching hospital.

Patients with falls resulting from external violence, for instance, traffic accidents, were excluded from the study. Patients were included from February 1, 2004, to July 1, 2005. The project was approved by the medical ethics committee of the AMC, and all patients gave informed consent before inclusion.

2.1. Methods of measurement

The Combined Amsterdam and Rotterdam Evaluation of Falls (CAREFALL) Triage Instrument (CTI) was developed on behalf of the Dutch National Falls Prevention Collaboration, in which more than 17 university-teaching and large general hospitals collaborate. This consortium constitutes the CAREFALL study group. The CTI consisted of 44 questions to determine patient characteristics, characteristics and possible cause(s) of the fall, and (modifiable) risk factors for falling. The validation of the CTI was described elsewhere [12]. The CTI was designed to identify modifiable risk factors for recurrent falls in the older population. The CAREFALL Triage Instrument was shown to be an adequately valid and reliable instrument for assessing modifiable risk factors in older patients presenting to the accident and ED after a fall [12]. To our knowledge, no other valid and reliable self-assessment instruments are available for screening patients with an increased risk of falling, visiting the A&E department after a fall.

All charts of patients visiting the A&E department were reviewed on a daily basis to identify patients eligible for inclusion. All eligible patients received a letter explaining the purpose of the study and the CTI, within 1 week after presentation at the A&E department. Nonrespondents were contacted by telephone 2 weeks after sending the questionnaires and requested to fill out the questionnaire. To compare between the respondents and the nonrespondents, patients' characteristics and consequences of the fall of the subjects were extracted from the A&E department charts. The definition of a serious consequence of the fall was a fracture (of hip, femur, vertebral, or ankle) or hospital admission due to the fall. A nonserious consequence was considered as wounds or fractures of a smaller size (fingers, toes). This information was retrieved by an experience research nurse who was not involved with the statistical analysis. The nurse was unaware of the study hypothesis and the results of the patients CTI score because these were only available after presentation. In case of doubt, a geriatrician (S.R.) was asked for advice.

Modifiable risk factors are defined as risk factors that can be improved or removed by an intervention. The following modifiable risk factors were assessed: impaired vision, balance and mobility, fear of falling, mood disorder, high risk of osteoporosis, orthostatic hypotension, incontinence of urine, and polypharmacy.

Because of a lack of international standard definitions of most modifiable risk factors, we used the following procedure: based on the literature and the opinion of a multidisciplinary expert panel, positive scores for 8 modifiable risk factors were defined [7], [8], [11], [13], [14], [15], [16], [17], [18], [19], [20], [21], [22] and [23]. These definitions are described in Table 1. To obtain a sensitive instrument for identifying risk factors, most risk factors were considered to be present when one of the relevant items was answered positive, with the exception of the risk factors depression (score over 4), polypharmacy (3 or more medications used), and osteoporosis (international standard [24]). To compare the epidemiology and presence of modifiable risk factors, patients were categorized based on whether or not they experienced a serious consequence as a result of their fall.

Patients were defined as having a serious consequence of the fall when the fall resulted in a fracture and/or the patient was hospitalized because of the fall. Also, patients with a recurrent fall were compared to those presenting with a first fall.

[TABLE 1]

2.2. Data analysis

All data were entered into an SPSS database and analyzed using SPSS (SPSS, Chicago, Ill) and confidence interval (CI) analysis. Categorical data were expressed as a percentage and as difference in proportion between groups, with the 95% CI of the difference calculated using the Wilson method. Normally distributed numerical data were expressed as mean (SD) and as a mean difference between groups with 95% CI of the difference. Nonnormally distributed numerical data were compared using expressed as median (range/quartiles) with median differences between groups with 95% CIs calculated using a binomial method.

A risk factor was defined as missing when more than 50% of the CTI items, of which the risk factor was composed, were missing in a patient. To identify those predefined clinically relevant factors (age, sex, and the 8 previously defined risk factors) that are associated with the consequence (fracture and/or hospital admission was defined as serious consequences and all others as mild) of the fall and whether the fall was a first or a recurrent event, multivariate logistic regression models were used. The predefined risk factors were entered into the model using the forward-stepwise (LR) method. Only factors that were statistically significant ($P < .05$) contributors to the multivariate model were considered to be independently associated with the outcome of the fall or whether the fall was a first or a recurrent episode. The Hosmer and Lemeshow test was used to assess goodness of fit ($P > .05$), and the area under the curve was calculated to assess the discriminative ability of the model.

3. RESULTS

During this inclusion period, 1077 patients visited the A&E department of the AMC with a fall. Of these patients, 639 of (59.3 %) 1077 returned their questionnaires. Data to calculate the presence of risk factors were missing in 3.1% (risk of osteoporosis) to 28.5% (depression) of the cases (see Table 3).

Of the 1077 eligible patients, 623 (57.8%) had serious consequences of the fall; 365 (33.9%) were admitted to hospital after the fall and 481 patients (44.7%) had a fracture, of which 159 patients (33.1%) had a hip fracture.

Among the nonrespondents, age and sex were similarly distributed, but there was a relatively higher number of patients with hip fractures (18.3% vs 12.4%; difference, 5.9%; 95% CI, 1.6%-10.5%) in this group. Furthermore, hospitalization among nonrespondents was higher than for the respondents (41.1% vs 28.9%; difference, 12.1%; 95% CI, 6.4%-17.9%).

Patient characteristics of the respondents are described in Table 2. Mean (SD) age was 78.5 (7.8) years, and more than 70% of the respondents were women. At the moment of the fall, 91.5% of the patients lived independently with or without help and 55.4% lived alone. The respondents had a median of 3 risk factors (quartiles, 2-4), and 9.7% of the respondents had none of the studied risk factors. Table 3 shows the prevalence of the 8 different modifiable risk factors. Balance and mobility disorder factor was the most prevalent risk factor, whereas sight, mood, and orthostatic hypotension were present in less than 40% of the patients (Table 3).

[TABLE 2]

[TABLE 3]

3.1. First fall versus recurrent fall

Of the respondents, 45.9% indicated that it was their first fall in the past 12 months. The group of patients with a recurrent fall consisted of significantly more women (78.0%) than

the first-time fallers (65.9%; difference, 12.2%; 95% CI, 5.2%-19.1%). Mean (SD) age of patients presenting with a recurrent fall was higher than that of patients presenting with a first fall (80.2 [8.1] years vs 76.6 [7.1] years; difference, 3.6 years; 95% CI, 2.4-4.8 years). The median number of risk factors in patients with a first fall was 2 (quartiles, 1-3) versus 4 (2-5) in patients with a recurrent fall (median difference, 1.0; 95% CI, 1.0-2.0). Fig. 1 shows the distribution of the number of risk factors for patients presenting at the A&E department at the AMC with a first fall and those with a recurrent fall. Age and the risk factors of mobility, high risk of osteoporosis, incontinence, fear of falling, and orthostatic hypotension were independently positively associated with a recurrent fall (see Table 4). Presence of a higher number of risk factors independently associated with a recurrent fall was almost linearly associated with a higher risk of recurrent falls (0 risk factors, 32% [95% CI, 26%-39%] risk; 1 risk factor, 55% [95% CI, 49%-62%] risk; 2 risk factors, 79% [95% CI, 73%-86%] risk of being recurrent faller; P < .01).

[FIGURE 1]

[TABLE 4]

3.2. Outcome of the fall

Of 639 patients returning the CTI questionnaire, 363 (56.8%) had a serious consequence of the fall. In the group of respondents, 45.9% of the patients presented with a fracture and 28.8% were admitted to the hospital due to the fall. There was a significant difference in the median number of risk factors between patients with a mild or serious consequence of the fall (2 [quartiles, 1-4] vs 3 [2-4]; median difference, 1.0; 95% CI, 1.0–2.0). Fig. 2 and Table 3 show the distribution of number of risk factors for patients presenting with mild and serious consequences due to the fall. Patients with a serious consequence of the fall were more often women (76.9% vs 66.7%; difference, 10.2%; 95% CI, 3.2%-17.2%) than patients without a serious consequence. This difference was mainly caused by a difference in the prevalence of fractures between women and men (51.0% vs 32.4%; difference, 18.6%; 95% CI, 10.1%-26.5%). Mean (SD) age between these groups differed, with 76.8 (7.5) years for patients without a serious consequence of the fall and 79.8 (7.8) years for patients who had a fracture or sustained a hospital admission (difference, 3.0 years; 95% CI, 1.7-4.2 years). Patients with a recurrent fall had a serious consequence of the fall in 60.9% of the cases, whereas 51.9% of the patients who fell for the first time had a serious consequence (difference, 9.1%; 95% CI, 1.4%-16.7%).

[Figure 2]

The risk factors high risk of osteoporosis (odds ratio [OR], 4.5; 95% CI, 2.8-7.3) and age (OR, 1.04; 95% CI, 1.00-1.07) were the only risk factors that proved to be associated with a serious outcome of the fall in the multivariate analysis (Table 4).

4. DISCUSSION

The main purpose of this study was to investigate the prevalence and distribution of 8 modifiable risk factors in patients with recurrent falling and/or a serious consequence of the fall among older people visiting the A&E department after a fall. For this purpose, we used the CTI, a validated self-administered questionnaire. This study shows that all risk factors were present in more than 35% of the patients, and the risk factors problems with balance and mobility, polypharmacy, and high risk of osteoporosis were even present in more than half of the patients.

In our study, 54% of the fallen patients had recurrent falls. This is comparable to other studies reporting percentages varying between 39% and 65% [7], [8], [9] and [21]. All risk factors except impaired vision were more prevalent in patients who fell more than once in the past year than in first-time fallers. Also, the number of risk factors present in patients

who fell twice or more was significantly higher (4 vs 2), and the risk of being a recurrent faller was higher in patients with a higher number of risk factors that were independently associated with recurrent falling, confirming an additive effect of the risk factors on risk of recurrent falls. This indicates that even in patients with a low number of risk factors, the risk of being a recurrent faller is already high, requiring clinical evaluation and, if possible, treatment removal of the risk factor.

Previous studies investigating older individuals with a fall described admission rates varying from 19.7% to 58.5%, and the proportion of patients who had a fracture varied between 26.8% and 30.4% [17], [21] and [25]. These studies, however, excluded without exception cognitively impaired persons. In studies including cognitively impaired patients, hospital admission rates were comparable to our findings, whereas fracture rates varied from 24.5% to 72% [17] and [26].

There are some limitations to this study. The CTI, assessing the presence of modifiable risk factors, is a self-administered questionnaire, and is based on the information supplied by patients and/or their caregivers [12]. This, in combination with the fact that the questionnaire was sent to the patient in the week after the episode, especially in this age group, could have led to recollection bias. Filling out the questionnaire during the visit to the A&E in the Dutch clinical setting would be too time-consuming to be effective, but might be possible in other regions. In addition, during the development of the CTI, items concerning 8 different modifiable risk factors were incorporated, based on literature [7], [8], [11], [13], [14], [15], [16], [17], [18], [19], [20], [21], [22] and [23] and expert opinion. There was, however, no international supportive standard nomenclature we could use in this development process of the CTI. Only for the modifiable risk factor high risk of osteoporosis was the definition strict as described in the guideline "Osteoporosis" [24]. However, comparing our results with studies in which the prevalence of modifiable risk factors was clinically observed [6], [7], [8], [9], [10], [13], [14], [15], [17], [20] and [21], the definitions used seemed to be correct, and therefore, the CTI seems to be a valid questionnaire. The more formal validation of this instrument has been published elsewhere [12].

Another limitation is the lack of information concerning cognitive functioning of the included patients. Cognition is an important risk factor for falling, and in randomized trials concerning the efficiency of a multifactor intervention, cognitively impaired patients are often excluded [8] and [17], anticipating a worse outcome of the interventions. Recent studies on patients without cognitive decline presenting with a fall in the ED showed that multifactorial and multidisciplinary interventions after risk identification led to a reduction in recurrent falls of 365 to 50% [8] and [17].

For obvious reasons, patients with serious consequences were less likely to respond to the questionnaire than patients with less serious consequences. This could have led to an underestimation of the number of modifiable risk factors in this population. The total number of possibilities for prevention could therefore be even higher. Despite this growing evidence that a multifactorial intervention can benefit in preventing falls, only a few patients are being referred to outpatient fall-prevention clinics [25], [27] and [28].

In our study, the charts at the A&E department were reviewed by only 1 nurse. This could have led to an underestimation of the number of patients presenting with falls because patients presenting with a trauma or fracture might not have been recognized as experiencing a fall. This, however, probably did not influence the proportion of patients with severe falls or specific risk factors.

The risk factors balance and mobility, fear of falling, and high risk of osteoporosis were significantly more prevalent in patients experiencing a serious consequence of the fall but were not independently associated with the outcome in the multivariate model. High risk of osteoporosis was an independent modifiable predictor of a serious consequence of the fall. In the group of fallen patients without a fracture or hospital admission, the number of risk factors was significantly lower than that in the group with a serious consequence of the fall. Furthermore, patients who fell more than once experienced more often a fracture or had to be

admitted to the hospital. These results were in accordance with the results of the study of Pluijm et al [15], who also showed that recurrent fallers were significantly more prone to fall-related fractures than nonrecurrent fallers (OR, 3.8) in a prospective 3-year follow-up study of community-dwelling persons 65 years and older. These results suggest that when assessing the risk of subjects presenting with a fall for a recurrent fall and/or risk of serious consequence of a fall, the presence of the risk factors age, balance and mobility, osteoporosis incontinence, fear of falling, and orthostatic hypotension should lead the decision making of the physician. These results also suggest that a reduction in the number of modifiable risk factors in patients visiting the A&E department after a fall might lead to a reduction in recurrent falls and fewer patients who experience a fracture or have to be admitted to the hospital as a consequence of a fall, but this will have to be tested in future studies.

5. CONCLUSIONS

In conclusion, until now, our study is the largest study investigating the prevalence and distribution of modifiable risk factors in patients presenting at the A&E department after a fall by using a self-administered questionnaire. Our results show that in our population, the prevalence of modifiable risk factors assessed by the CTI is comparable to studies in other high-risk populations in which the prevalence of risk factors was assessed after physical examination. By using the CTI, the process of selecting patients who might benefit from a multifactorial preventive intervention strategy after visiting the A&E department due to a fall can be made without time-consuming physical examination to determine the presence of modifiable risk factors, although the effectiveness of the preventive intervention should be prospectively evaluated. Because the fallen patient can complete the questionnaire himself, the CTI also offers a cost-efficient, quick, and easy way of triage in selecting high-risk patients who visit the A&E department due to a fall for referral to an outpatient fall-prevention clinic.

Acknowledgments

Appendix A. Key points

• Many risk factors associated with recurrent falls in older people have been investigated.
• The prevalence and distribution of modifiable risk factors in patients presenting at the A&E department after a fall were studied by using a self-administered questionnaire, the CTI.
• The process of selecting patients who might benefit from a multifactorial intervention to prevent from recurrent falls can be made by determining the presence of modifiable risk factors assessed by the CTI.
• Age and 5 modifiable risk factors assessed with the CTI were independently associated with a recurrent fall.
• Only "high risk of osteoporosis" was associated with a serious consequence.

Appendix B. Supplementary data

Supplementary data associated with this article can be found, in the online version, at doi:10.1016/j.ajem.2009.06.003.

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TABLES AND FIGURES

Table 1

Table 1 Definitions of the 8 modifiable risk factors

Modifiable risk factor	Definition
Impaired vision	- Unable to read the newspaper, even with (magnifying) glasses or a loupe and/or - Substantial reduced sight since the last 6 mo
Balance and mobility	- Difficulties with walking and/or - Use of an aid for walking and/or - A lack of balance and/or - Pain in feet or legs and/or - Reduced feeling in feet or legs and/or - Reduced strength in one or both feet and/or - Stiffness of the joints
Fear of falling	A score of 5 or more on a scale from 1 (no fear of falling) to 10 (a very large fear of falling) on the CTI question: "Are you afraid to fall?"
Mood	One or more of the following questions were answered positive if the last month - Feeling down or depressed - Loss of interest
High risk of osteoporosis	Patients with a fracture after the age of 50 y and/or a fracture of the vertebra and/or 2 of the 3 following factors positive: - Mother experienced a hip fracture - Low body weight (men, <67 kg; women, <60 kg) - Severe immobility
Orthostatic hypotension	One or more of the 9 concerning CTI questions for orthostatic hypotension was/were answered positive
Incontinence	- Daily problems with urine continence and/or - Need to get out of bed twice or more a night to visit the toilet
Polypharmacy	Using 3 or more medications, independent of type

Table 2

Table 2 Patients characteristics of respondents, n (%)

Characteristic	Respondents (n = 639)
Sex: female (%)	72.5
Mean (SD) age (y)	78.5 (7.8)
Marital status (%)	
Married/living with partner	40.4
Widow/widower	36.2
Single/divorced	19.2
Living together	4.2
Personal situation	
Living independent without help	48.9
Living independent with help	42.6
Home for older people/Nursing home	8.5
Use of alcohol (% patients)	43.8
Smoking (% patients)	13.6
Comorbidity (%)	
Diabetes mellitus	11.9
Hypertension	33.9
Cerebrovascular accident	11.3
Myocardial infarction	10.6
Vision disturbances	27.7
Thyroid illness	9.1
Malignancy	11.7
Other	28.3
No. of falls (%)	
First fall	45.9
Recurrent fall	54.1
Severity	
Fracture	45.9
Hip fracture	12.4
Hospital admission, fracture	17.9
Hospital admission, no fracture	10.9
No fracture, no hospital admission	43

Table 3

Table 3 Prevalence of modifiable risk factors in the total group of patients and the difference in prevalence (with *P* value) between patients who fell for the first time and patients who experienced recurrent falls

Modifiable risk factor	Total group	First fall	Recurrent fall	% Difference (95% CI)	Mild consequence of fall	Serious consequence of fall	Difference (95% CI)
Sight (%)	36.7	33.4	39.5	6.1 (3.9–13.6)*	33.2	39.4	6.2 (−1.6 to 13.7)
B&M (%)	69.3	56.7	79.9	23.2 (15.8-30.3)*	63.1	73.9	10.7 (3.2-18.2)*
Fear of falling (%)	43.8	24.8	59.6	34.8 (27.1-41.8)*	35.4	50.1	14.8 (6.8-22.4)*
Mood (%)	37.2	27.2	45.1	17.9 (9.0-26.2)*	34.1	39.7	5.5 (−3.4 to 14.2)
OH (%)	37.7	19.6	50.9	31.3 (22.9-39.0)*	35.0	39.7	4.7 (−4.2 to 13.3)
Incontinence (%)	49.6	35.8	61.3	25.4 (17.6-32.8)*	46.6	51.9	5.2 (−2.7 to 13.1)
High risk of osteoporosis (%)	51.2	38.5	61.9	23.4 (15.5-30.8)*	33.8	64.6	30.7 (23.0-38.0) *
Polypharmacy (%)	52.5	47.8	56.6	8.7 (0.7-16.6)*	49.4	54.9	5.5 (−2.5 to 13.4)

Also risk factors of patients with serious consequences and patients mild consequences of falling were tested. Missing data: sight, 5.0%; balance and mobility (B&M), 5.6%; fear of falling, 5.6%; mood disturbance, 28.5%; orthostatic hypotension (OH), 26.1%; incontinence, 3.8%; high risk of osteoporosis, 3.1%; polypharmacy, 6.1%.
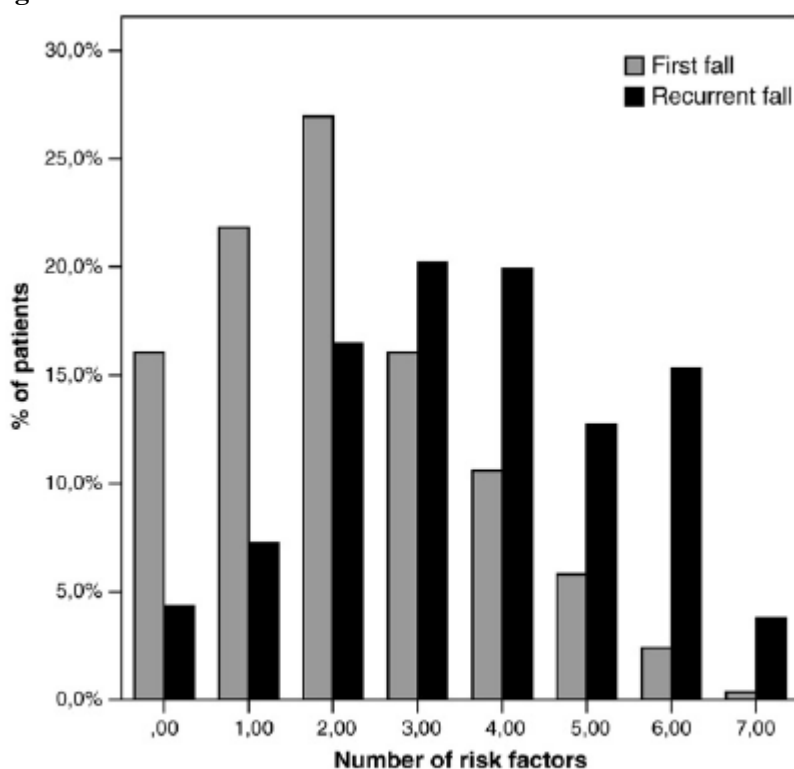 * Significant at $P < .05$.

Figure 1

Fig. 1 Histogram of the number of risk factors for patients with a first fall and patients with a recurrent fall.

Table 4

Table 4   Factors associated with a recurrent fall in multivariate logistic regression model

Variable	Recurrent falls [a]		Serious outcome [a]	
	OR (95% CI)	P	OR (95% CI)	P
Age	1.04 (1.00-1.07)	.037	1.04 (1.00-1.07)	.025
RF B&M	1.9 (1.1-3.3)	.013		
RF High risk of osteoporosis	2.0 (1.2-3.2)	.007	4.6 (2.9-7.2)	<.001
RF Incontinence	1.7 (1.0-2.7)	.045		
RF Fear of falling	2.2 (1.3-3.7)	.004		
RF OH	2.4 (1.4-4.2)	.002		

B&M indicates balance and mobility; OH, orthostatic hypotension; RF, risk factor.
   [a] Hosmer and Lemeshow goodness-of-fit: $P = .64$ (recurrent falls); $P = .68$ (serious outcome). Area under the-curve: 0.72 (95% CI, 0.62-0.74; $P < .01$; recurrent falls); 0.68 (95% CI 0.67-0.77; $P < .01$; serious outcome).
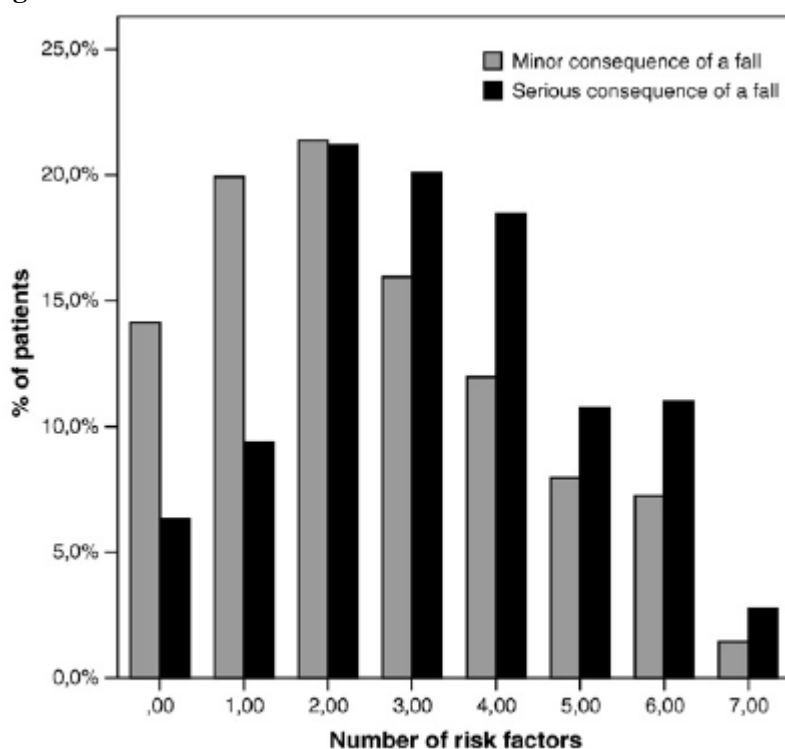
Figure 2

Fig. 2   Histogram of the number of risk factors for patients with serious consequences due to a fall and mild (minor) consequences.