

Screening for fall risk in the elderly in The Capital Region of Copenhagen: the need for fall assessment exceeds the present capacity

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ABSTRACT

INTRODUCTION: As falls in the elderly are a major problem, the Danish National Board of Health recommends systematic screening of 65+ year-olds who visit an emergency department following a fall.

MATERIAL AND METHODS: As part of a fall prevention programme, screening for fall risk was carried out in four different settings where health staff meets elderly fallers. All falls were recorded and patients interviewed.

RESULTS: A total of 2,016 falls were registered. Among these, 1,074 were accidental episodes of which 413 occurred in elderly patients with good balance. There were significant differences between the various screening locations. Need for fall prevention ranged from 50% to 84%. Elderly who were cognitively or physically impaired and elderly with abuse issues fell frequently and a need for fall preventive actions was observed in up to two of three falls in this subgroup of elderly.

CONCLUSION: The study shows that the need for fall prevention is considerable and that the estimated need for fall prevention far exceeds the capacity of geriatric fall clinics. As the number of elderly will increase in coming years, it should be explored to which extent recommendations concerning identification and assessment of elderly fallers are followed and whether recommendations result in fall preventive actions.

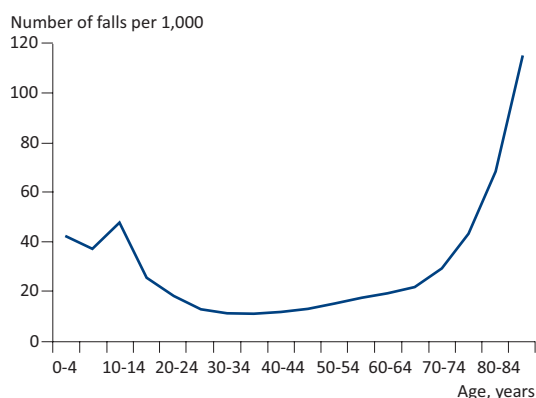
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It is well established that falls are a major problem for the elderly. Each year about one in three persons aged 65 or more falls at least once and 10-20% of falls result in serious injury [1]. The fall frequency increases significantly with age (Figure 1). Fall accidents are the cause of 75% of casualty visits in the elderly and result in a significant number of hospital bed days. Falls are associated with increased mortality, morbidity, disability, loss of independence and thus have substantial socio-economic consequences [2]. If the frequency of falling continues unchanged, the cost will grow significantly in the

FIGURE 1

Fall incidence per 1,000 persons per year based on data from four emergency departments in Denmark 2004-2008. Danish Injury Register, National Institute of Public Health.



coming decades as the proportion of elderly in the population increases [3, 4]. Within the next three decades, the number of 65+ year-olds in Denmark will nearly double [5].

A number of studies have shown that by identifying risk factors and adopting corrective/preventive measures it is possible to reduce the risk of falling [6-8]. Those who were studied were cognitively intact, motivated community-dwelling elderly, while multifactorial intervention in patients with dementia was not proven to be effective [9]. In very frail nursing home residents and even in the demented individuals, indirect intervention, such as staff education and environmental adaptation, may reduce the risk of falling [10, 11].

Based on the available evidence, the Danish National Board of Health (DNBH) recommends systematic screening of 65+ year-olds who visit emergency departments following a fall. According to the recommendations, there is a need for post-fall assessment if an elderly faller answers "yes" to one or more of four questions about gait or balance problems, further falls within the last year, dizziness or possible syncope [12]. This assessment can be carried out by the general practitioner (GP) or at the hospital, e.g. in a falls and syncope

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 TABLE 1

Screening for fall risk in four settings in Frederiksberg – a municipality of the Capital Region with 93,000 inhabitants of whom 15,000 are 65 years or older. Information obtained and number of falls.

	ED-out	ED-ward	PHV	HCS
Who performed the screening?	1 of 7 doctors	Nurse from geriatric team	Staff from PHV	Staff from District 1 of HCS
How often was screening performed?	All patients seen by this doctor	Twice a week on varying days in the week	At all visits These were offered twice a year	At all visits
Fall recorded and the patient interviewed if	Reason for ED visit was a fall	Admission was due to a fall	Fallen since previous visit	Fallen since previous visit
Interview concerning: type of fall (accidental, possible syncope, unexplained), self-estimated balance, general health and comorbidity	+	+	+	+
Complementary health information available	+	+	–	+
Screened according to the recommendations from DNBH	+	+	–	–
<i>Number of falls/fallers recorded</i>				
1 Oct 2006-14 July 2008	204/199	200/189	965/?	647/?
1 April 2007-14 July 2008	–	–	–	534/167

DNBH = Danish National Board of Health; ED-out = Emergency Department for outpatients; ED-ward = Emergency Ward for inpatients; HCS = Home Care Service; PHV = Preventive Home Visits.

clinic. Such clinics are established at most geriatric departments in order to assess the underlying reasons for falling and to plan appropriate interventions. The capacity of the geriatric falls clinics is limited. In the Capital Region of Copenhagen, for example, there are seven falls clinics with a total annual capacity of approximately 1,000 assessments. More than 260,000 persons over 65 years are living in the Region, about 86,000 of whom will fall annually.

The reasons for falling are various. Many falls are due to either balance disorders or disturbances in heart rhythm or blood pressure. Some falls are accidental. Accidental falls occur at all ages, both in persons with good and poor balance. Some falls are unexplained, e.g. without any apparent cause, and in other cases the fall is part of a syncope. However, falls may also be a symptom of weakening due to acute illness or be caused by terminal disease. A single accidental fall in an elderly person with good balance does not require fall assessment, but other types of fall need thorough assessment and in case of a suspected syncope or unexplained falls; this may include special assessment of heart rhythm or a tilt table test. Knowledge of the type of fall may be useful when planning the necessary assessment. In the population of fallers identified by screening, the need for action will vary. Some fallers need thorough assessment while in others the fall risk is part of an already known problem requiring supportive actions, e.g. elderly fallers with dementia, patients abusing alcohol or medicine and patients weakened due to terminal illness. Information on the proportion of patients belonging to these subgroups is important in the planning of future fall prevention in the community.

The aim of the present study was to describe the

results of fall risk screening in a sample of elderly in four different settings where health staff meets elderly fallers. The specific questions we aimed to answer were as follows:

- How many of the accidental falls occur in elderly with good balance?
- How many of the falls call for fall preventive actions?
- How many of the falls occur in elderly with dementia, terminal illness or abuse issues – and do these elderly fall more frequently than others?
- What proportion of the falls requiring post-fall assessment according to the DNBH occurs in elderly with dementia, terminal illness or alcohol/medicine abuse?

MATERIAL AND METHODS

The screening was conducted as part of a fall prevention program and was carried out in four settings: Emergency Department for outpatients (ED-out), Emergency Ward for inpatients (ED-ward), Home Care Service (HCS) and Preventive Home Visits (PHV) as shown in **Table 1**. All falls were recorded and patients were interviewed using a defined frame to determine whether the fall could be considered a single accidental fall, a possible syncope or an unexplained fall with no apparent cause. Patients were interviewed about their balance and whether they estimated that it was good. Information about general health and comorbidity was obtained, if necessary supplemented with information from available records. It was noted if the patient had a known abuse or severe disease such as disseminated cancer, end-stage renal, liver or lung disease or terminal heart failure. Cognitive

function was assessed qualitatively and implemented in the assessment of the patient's fall history. If there was no suspicion of severe cognitive impairment, patients were categorized as having no need for fall prevention, provided they reported good balance and a single accidental fall. In ED-ward and ED-out, the four questions recommended by the DNBH were also asked. In the HCS, the number of falls in each person was recorded after 1 April 2007.

Data processing and statistics

The material was typed anonymously in Excel and analyzed in SPSS. The test used was chi square.

Trial registration: not relevant.

RESULTS

A total of 2,016 falls were recorded in the period (Table 2). The average age of the faller was 82.7 years (65-103 years) and almost three in every four were women.

Accidental falls. In all, 1,074 of the recorded cases were considered accidental falls, including 413 cases of a single accidental fall in people with good balance. There were significant differences in the frequency of these falls between the four settings. More of these falls were seen in the ED-out and less in the ED-ward and the HCS. The proportion of accidental falls among elderly with a good balance decreased with age from 54% of the 65-69 year-olds in the ED-out to 16% of the 90+ year-olds ($p = 0.001$)

Need for fall prevention. There were large differences in the need for fall prevention between the four settings ($p < 0.000$). In the PHV and ED-out, more than a third of the cases required no action, primarily because many of these were accidental falls in persons without balance problems. In contrast, only one in every ten falls in the ED-ward and the HCS. It was therefore concluded that there was no need of fall prevention. In these settings, it was found that between half and two thirds of cases with a need of preventive actions occurred in elderly with cognitive impairment, terminal illness or abuse issues. Especially falls due to abuse accounted for a significant share of fall incidents in the HCS. From April 2007 until the end of the screening period in July 2008, 534 falls in 167 people were recorded in the HCS. A total of 53 of these were people who fell mainly due to abuse ($n = 24$), terminal disease ($n = 14$) or dementia ($n = 15$). These individuals were registered with an average of 8.3, 2.9 and 2.6 falls, respectively, during the period, while the fall rate in the remainder of cases needing fall prevention was two on average.

Assuming that screening is performed continuously in the ED, the number of annual post fall assessments is shown in Table 3. The estimated figures are based on



TABLE 2

Gender, age and assessment of need of fall prevention in the four settings of screening: Emergency Department for outpatients (ED-out) and Emergency Ward for inpatients (ED-ward), Preventive Home Visits (PHV) and Home Care Service (HCS).

	ED-out	ED-ward	PHV	HCS
Total, n	204	200	965	647
<i>Gender, n</i>				
Male	46	66	228	183
Female	158	134	732	458
Not stated	–	–	5	6
Age, years, mean (SD)	80.5 (8.1)	82.7 (7.7)	83.3 (6.1)	82.6 (8.7)
Need of fall prevention, n (%)				
Total	101 (50)	163 (82)	536 (56)	476 (74)
Accidental falls and poor balance	41	12	247	94
Possible syncope	19	28	128	14
Unexplained falls	8	23	35	0
Other falls	8	13	71	70
Cognitive impaired	18	41	20	50
Terminally ill	2	21	34	49
Abusers	5	25	1	199
Subgroup, total	25 (25)	87 (53)	55	298 (63)
<i>No need of action</i>				
Total	76 (37)	22 (11)	322 (33)	81 (13)
A single accidental fall without need for any action	57	10	255	32
Other accidental event/not relevant	16	11	30	33
Medical diagnosis as cause of fall	0	1	37	7
Not stated	3	0	0	9
Have been referred or earlier assessed	2 (1)	11 (6)	106 (11)	62 (10)
Nursing home resident	24 (12)	4 (2)	1 (0)	9 (1)
Not stated	1 (0)	0 (0)	0 (0)	19 (3)

SD = standard deviation.



TABLE 3

Estimated annual number of falls provided fall risk screening in the study area is performed continuously throughout the year and assuming that the share of 65+ year-olds in the Capital Region needing post fall assessment is the same as in the study area.

	ED-out	ED-ward
Annual number of falls in Frederiksberg Municipality	779	370
Number of patients needing post fall assessment	390	303
Annual number of falls in the Capital Region	13.503	6.413
Number of patients needing post fall assessment	6.752	5.259

ED-out = Emergency Department for outpatients; ED-ward = Emergency Ward for inpatients.

the obtained study results regarding number of recorded falls and the proportion needing fall prevention.

Screening for need of post-fall assessment carried out in accordance with DNBH recommendations. One or more of the DNBH's questions were answered by 394 fallers. A total of 347 (86%) responded to all four questions. In 100 (29%) of these, respondents answered "no" to all four questions meaning that there was no need for post-fall assessment. There was a need for as-

assessment in 247 cases according to the DNBH criteria. Among these patients, the study screening identified 201 (81%) with a need for fall preventive actions, 34 (14%) in whom the problem was already taken care of or they did not need additional action and 12 nursing home residents. Among those who needed fall prevention according to the DNBH criteria, 68 (28%) occurred in elderly with abuse, terminal disease or dementia.

DISCUSSION

The present study describes the results of screening for fall risk in different settings where health staff meets elderly fall patients. Different screening settings were chosen to obtain the broadest possible basis for an estimation of the scope of the problem. The screening mode was adapted to the varying conditions of each setting and was therefore not identical across settings, but the interviews were made in the same way and using the same criteria for categorization of type of fall and need for fall prevention. In this study, the DNBH's screening questions were replaced with an interview focusing on type of fall as this may provide hints for the planning the further assessment. However, the definition of who needs fall assessment is the same and there is therefore a good correlation between the results obtained from the two methods of screening.

The study showed large differences between the four settings, both concerning type of fall and need for assessment. Also the prevalence of elderly with dementia, terminal illness or abuse differed between the settings. In the ED-out there were many accidental falls in elderly without balance problems as expected in active senior citizens, but there were just as many falls among the frail, the demented, the terminal ill, abusers and nursing home residents. A previous Danish study of elderly fallers in the emergency department for outpatients showed that 39% were admitted to the hospital and in the following six months, 13% died and 30% were readmitted [13]. Thus, it is not surprising that in the ED-out, a significant part of the patients belong to the frail group. Elderly with a need for home care must be considered weaker than self-reliant elderly. Compared to the HCS, where all patients receive home care, only 40% of the clients in the PHV have outside help. This may be the reason why very few are considered demented or abusers in the PHV-setting. Another reason may be that the PHV staff does not have access to patients' medical or nursing-related patient information. Both among the generally healthier clients of the PHV and the ED-out, there were many with good balance. The finding that this proportion decreases with increasing age fits well with our expectations.

Falls are associated with fear of falling which causes inactivity and thus results in decreasing muscular strength and increasing risk of falling [14]. It is important to identify patients at risk as early as possible, before they are injured and while they still have sufficient resources to contribute to the interventions needed to reduce the risk of falling. As intervention programs have resulted in a reduction in the risk of falling, internationally accepted guidelines have been published concerning the identification of patients at risk, medical assessment and intervention [15]. Despite this, a recent study indicates that the guidelines are poorly implemented. Only 3% of community-dwelling seniors who visited an ED after a fall received an assessment according to guidelines [16].

In Denmark, the DNBH published official guidelines on systematic screening of 65+ year-olds with falls and according to these recommendations, elderly people at risk should be advised to seek the appropriate preventive services. It is not known to which extent these recommendations are followed.

Community-dwelling elderly citizens with dementia, abuse or terminal disease need special attention. These frail patients will hardly follow advice from ED staff to see their general practitioner for fall prevention. In 2008, a quality assurance project was carried out at the ED of Frederiksberg Hospital with the aim of implementing fall risk screening according to the DNBH guidelines.



As long as you are seated, you are safe from falling.

Data from this project show that in the overwhelming majority of cases, the need for post-fall assessment is not reported to GPs, even in cases in which patients were screened [17]. In a subsequent follow-up, only the most resourceful patients had followed the advice from the ED staff to consult their GP concerning the fall problem.

Screening programmes detect fall episodes and the same patient can thus be registered multiple times as was seen in the HCS, where especially abusers were responsible for many falls. In the ED, there are few revisits and the majority of the registered persons require fall prevention. Only in a few cases was the problem already taken care of. The estimated need for post fall assessment must be considered underrated as only falls in patients living in Frederiksberg were recorded. There were no data on how many of the municipality's elderly were seen at EDs outside the Frederiksberg area. Patients with fractures demanding surgery, such as hip or ankle fractures, are not seen in the Frederiksberg ED, but are referred directly to another hospital. That the estimated need for fall prevention is underrated is also supported by results from the above-mentioned quality assurance project which over a 3-month period recorded 1.7 times as many falls as the present study. Among the persons who had fallen, 19% lived outside the area. The estimated figures are based entirely on the 10-20% of all falls that need medical attention and the real need will therefore be much larger than calculated here.

With a total capacity of about 1,000 fall assessments per year, only a small fraction of the estimated number of patients needing fall assessment can be assessed at the geriatric falls clinics. It is unknown who takes care of the rest and to which extent patients are offered fall prevention initiatives.

CONCLUSION

The study shows that the spectrum of falls is wide, ranging from accidental inevitable falls not requiring fall assessment to falls in persons needing special fall preventive actions as in elderly with physical or cognitive weaknesses. A significant part of the falls occur in this group, but there were large differences between the four settings. The study confirms that the need for fall prevention is large and that the estimated need for fall assessment far exceeds the capacity of the geriatric fall clinics. With an eye to the future boom in the population of the elderly, it should be explored to which extent recommendations from the DNBH concerning older fallers are complied with and whether they actually result in fall preventive actions.

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