Consequences of falling in older men and women and risk factors for health service use and functional decline

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Abstract

Objectives: (1) to examine consequences of falls in older men and women and (2) to examine risk factors for health service use and functional decline among older fallers.

Methods: the study was performed within the Longitudinal Aging Study Amsterdam. In 1998/1999, potential risk factors were assessed during the third data collection. In 1999/2000, 204 community-dwelling persons (≥65 years) who reported at least one fall in the year before the interview, were asked about consequences of their last fall, including physical injury, health service use, treatment and functional decline (i.e. decline in functional status, social and physical activities).

Results: as a consequence of falling, respondents reported physical injury (68.1%), major injury (5.9%), health service use (23.5%), treatment (17.2%), and decline in functional status (35.3%), and social (16.7%) and physical activities (15.2%). Using multivariate logistic regression, specific risk factors for health service use after falling could not be identified. Female gender (OR = 2.8, 95% CI = 1.5–5.1), higher medication use (OR = 1.5, 95% CI = 1.0–2.2) and depressive symptoms (OR = 1.9, 95% CI = 1.3–2.8) were independently associated with functional decline after falling. Depressive symptoms (OR = 2.0, 95% CI = 1.2–3.3) and falls inside (OR = 2.6, 95% CI = 1.1–6.5) were risk factors for decline in social activities, while female gender (OR = 2.7, 95% CI = 1.1–7.0) and depressive symptoms (OR = 1.9, 95% CI = 1.2–3.0) were risk factors for decline in physical activities after falling.

Conclusions: almost 70% of the respondents suffered physical injury, almost one-quarter used health services and more than one-third suffered functional decline after falling. No risk factors were found for health service use needed after falling. Female gender, higher medication use, depressive symptoms and falls inside were risk factors for functional decline after falling.

Keywords: accidental falls, aged, consequences, disabled people, health services, elderly
entire impact of falling. A fall may generate fear of falling, which may lead to restriction in activity or increased dependency [8, 9]. The prevalence of other potential consequences of falling, such as functional decline, are not well known. All these consequences of falls place heavy demands on healthcare systems [10, 11]. Some studies examined the prevalence of medical help and treatment needed after falling [4, 12, 13], but these studies did not distinguish different types of health services and treatment.

Although it is important to prevent falls in general, it is particularly important to prevent those falls that cause consequences. Therefore, it is necessary to determine risk factors for falls with consequences. Several investigators identified risk factors for fall injuries [2, 5, 7, 14–17]. Additionally, falls and fall injuries appear to be risk factors for health service use and functional decline [18–21]. However, specific risk factors for health service use and functional decline among older fallers have not been identified.

The objectives of the present study are (1) to determine the consequences of falling in older men and women, and (2) to examine risk factors for health service use and functional decline among older fallers.

Materials and methods

Study sample

The current study was performed within a sub-sample of the Longitudinal Aging Study Amsterdam (LASA). The entire sample of LASA was a random sample of elderly men and women (55–85 years), stratified by age, sex and urbanisation, and was drawn from the population in three regions of the Netherlands. Data collection was performed each three years in 1992/1993, 1995/1996 and 1998/1999. The sampling and data collection procedures have been described in more detail elsewhere [22, 23].

The study design of the sub-study on consequences of falls is presented in Figure 1. Respondents of the current sub-study were 65 years and older as of 1 January 1996, completed a 3-year fall follow-up from 1995/1996–1998/1999 and completed the interviews of the third data collection cycle in 1998/1999 (n = 1074). To investigate the consequences of falls, we needed a sufficient number of fallers in the sample. It is known that falls in the past year are a good predictor for falls in the future [3, 6, 24]. Therefore, we selected all 328 respondents who fell at least once in the last year of the 3-year fall follow-up. Furthermore, we randomly selected 196 (of the 746) respondents who did not fall during this year, because in a previous study we used this sample to compare fallers and non-fallers [25]. Of the 524 eligible respondents, 85 respondents could not participate, because 14 deceased, 34 refused, 31 were not capable and six could not be contacted [25]. The 439 respondents who were enrolled in the study were visited at home by trained research nurses in 1999/2000 and were asked retrospectively whether they had fallen in the year before the interview. Of these, 204 respondents had fallen in the year before the interview and participated in this study on consequences of falling. Informed consent was obtained from all respondents and the ethical review board of the VU University Medical Center approved the study.

Consequences of falls

We assessed the direct consequences of the last fall in the year before the interview. The following consequences of falling were assessed: physical consequences, functional decline, health service use and treatment.

Physical consequences of the last fall were assessed, including fracture, open wound, bruise or extravasation of blood, sprain, joint dislocation, brain injury and strained muscle. In line with other studies [5, 7], major injury included fractures, joint dislocation and brain injury.

Functional decline as a consequence of the last fall was assessed by measuring decline in functional status, and decline in social and physical activities. Measurements of decline in functional status were based on a validated questionnaire about the degree of difficulty with functional activities: climbing stairs, dressing oneself, rising from a chair, cutting toenails, walking outside and using own or public transport [26, 27]. We asked whether the difficulty to perform these six functional activities had changed as a consequence of the last fall. The answer categories were: no more difficulty; some more difficulty; much more difficulty; and did not perform functional activity before the fall. A decline in functional status was considered to be present when the respondent reported ‘some more difficulty’ or ‘much more difficulty’ in at least one item. The functional status had not changed if the respondent did not perform this functional activity before the fall.

To assess decline in social activities because of falling, the respondent was asked whether he or she had gone less to family or friends, church,

Figure 1. Study design of the sub-study on the consequences of falls within the Longitudinal Aging Study Amsterdam (LASA).
trips or group activities as a consequence of the last fall. We only measured group decline in social activities outside the house, because fall consequences might have a greater impact on social activities outside than inside the house. The answer categories were: much less; a little less; not less; and did not go to these social activities before the fall. A decline in social activities was considered to be present when the respondent reported that he or she had gone ‘much less’ or ‘little less’ in at least one of these social activities. The social activity had not changed if the respondent did not participate in any of these social activities before the fall. To assess decline in physical activities after the last fall we asked whether the respondent was less physically active as a consequence of the last fall (yes/no). Less physically active was defined as a decline in any physical activity such as walking, bicycling, gardening, sport activities, light and heavy household activities. Moreover, we asked how long respondents were less physically active because of their fall.

Health service use after the last fall included visit to a general practitioner, admission to a hospital, rehabilitation and admission to a nursing home or home for the elderly. Additionally, we asked whether the respondent needed help in the household (external or partner) because of their last fall.

Treatment after the last fall included medicine use, surgery, physiotherapy and purchasing a walking aid.

Potential risk factors

So far, none of the studies examined the association between risk factors and health service use and functional decline among fallers. Previous studies have shown that falls and consequences of falls are caused by a combination of numerous intrinsic and extrinsic factors [1, 2, 5]. Therefore, risk factors that have been shown to be associated with general falls or injurious falls were considered as potential risk factors for falls with consequences in the current study [1, 2, 5]. All potential risk factors were assessed during the third data-collection of LASA (1998/1999), except the circumstances of falls that were assessed during the current study (1999/2000). The potential risk factors are presented in Table 1 and are described in more detail elsewhere [1].

In short, the risk factors included age, gender, number of chronic diseases including chronic obstructive pulmonary disease, cardiovascular disease, stroke, diabetes mellitus, malignant neoplasms, joint disorders [28], medication use, dizziness, visual impairment [29], body mass index, fear of falling measured by the Falls Efficacy Scale [30], depression measured by the Center for Epidemiologic Studies-Depression scale (CES-D) [31, 32], cognitive impairment measured by the Mini-Mental State Examination (MMSE) [33], grip strength using a hand held dynamometer [34], number of physical activities measured by the LASA Physical Activity Questionnaire (LAPAQ) [35], three performance tests including the walking test, chair stands and tandem stand [36], alcohol use, the number of falls in the year before the interview and falls inside the house.

Potential effect modifiers

Age, sex and recall period might be effect modifiers in the relationship between the potential risk factors and consequences of falling. The recall period was defined as the time between the last fall and the interview. The recall period might be a potential effect modifier, because with a longer recall period consequences of the last fall might have been forgotten more often and might therefore be underestimated.

Statistical analyses

To compare the prevalence of consequences due to falls between men and women, a Mann–Whitney test was used for continuous variables with skewed distribution and a chi-square test was used for categorical variables.

We first described the direct consequences of falling. After that, the associations between potential risk factors and the outcome variables health service use and functional decline as a consequence of falling were investigated. The observed relationship between all risk factors and falls with consequences was linear, with the exception of grip strength and physical activity. Therefore, all potential risk factors were treated continuously, except grip strength and physical activity. For grip strength and physical activity, the risk gradients across deciles and quartiles were examined and the optimal cut-off point was chosen, i.e. the quartile or decile that showed the strongest association with the outcome measures [37]. Sex-specific cut-off points were determined for grip strength because of the substantial differences between men and women. The associations between the potential risk factors and the outcome variables health service use and functional decline as a consequence of falling were investigated in four stages. First, we tested whether

Table 1. Subject characteristics (n = 204)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Mean, median or n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>78.7 (6.3)</td>
</tr>
<tr>
<td>Female</td>
<td>112 (54.9%)</td>
</tr>
<tr>
<td>Number of chronic diseases</td>
<td>1.0 [1.0–2.0]</td>
</tr>
<tr>
<td>Medication use (number)</td>
<td>2.0 [1.0–5.0]</td>
</tr>
<tr>
<td>Dizziness</td>
<td>57 (27.9%)</td>
</tr>
<tr>
<td>Visual impairment</td>
<td>47 (23.0%)</td>
</tr>
<tr>
<td>Body mass index (kg/m²)</td>
<td>27.3 (4.2%)</td>
</tr>
<tr>
<td>Fear of falling (FES: range 0–30)</td>
<td>3.0 [0–9.0]</td>
</tr>
<tr>
<td>Depression (CES-D: range 0–60)</td>
<td>9.0 [3.0–16.0]</td>
</tr>
<tr>
<td>Cognition (MMSE: range 0–30)</td>
<td>28.0 [26.0–29.0]</td>
</tr>
<tr>
<td>Grip strength (F ≤15 kgf; M ≤25 kgf)</td>
<td>50 (24.5%)</td>
</tr>
<tr>
<td>Physical activity (LAPAQ: ≤2 activities)</td>
<td>54 (26.5%)</td>
</tr>
<tr>
<td>Performance test score (range 0–12)</td>
<td>8.0 [3.3–11.0]</td>
</tr>
<tr>
<td>Alcohol use (glasses per week)</td>
<td>6.0 [1.0–18.0]</td>
</tr>
<tr>
<td>≥2 falls in year before interview</td>
<td>68 (33.3%)</td>
</tr>
<tr>
<td>Falls inside</td>
<td>95 (46.5%)</td>
</tr>
</tbody>
</table>

*Results are presented as mean (SD), median [25th, 75th percentile] or n (%).
†FES = Falls Efficacy Scale. Higher scores mean more fear of falling.
‡CES-D = Center for Epidemiologic Studies-Depression scale. Higher scores indicate more depressive symptoms.
§MMSE = Mini-Mental State Examination. Lower scores mean more cognitive impairment.

*The maximum value of the two trials of the right and left hand were summed and divided by two; F = females, M = males.
†LAPAQ = LASA Physical Activity Questionnaire.
‡The more time was needed the lower the physical performance scores.
there was a significant effect modification \( (P < 0.01) \). Because we had to perform many statistical tests, an interaction term was considered to be significant with a \( P \)-value < 0.01. Secondly, multiple logistic regression was performed with adjustment for age and sex. Thirdly, additional adjustment was performed for only those potential confounders that changed the strength of the association (beta) with at least 10% [37]. For continuous risk factors, odds ratios were examined for one standard deviation change in the risk factor. These units are provided in the tables.

Results

Sample

Table 1 shows the subject characteristics of the participants of the study who had fallen at least once in the year before the interview \( (n = 204) \). The age range of the 204 fallers was 69.0–92.0 years, and 21.1% of these respondents were older than 85 years. The 25th percentile, median and 75th percentile of the recall period was 0, 3 and 9 months, respectively. Using Chi square statistics, similar prevalence of consequences of the last fall were found for a recall time of < 3 months versus > 3 months \( (P > 0.05) \).

Consequences of the last fall

Table 2 shows the consequences of the last fall for all fallers and for men and women separately. As a consequence of falling, 139 respondents (68.1%) suffered physical injury, 48 respondents (23.5%) used health services and 35 respondents (17.2%) needed treatment. According to the definition (see methods), 5.9% of the respondents suffered major physical injury. After their fall, 43 respondents (21.2%) went to their general practitioner. Concerning treatment, in 21 respondents (10.3%) medication was prescribed or changed (i.e. lower doses) whereas 16 respondents (7.9%) were referred to a hospital. Women reported general physical injury, bruising or extravasation of blood significantly more often compared with men \( (P < 0.05) \). Female gender was borderline significantly associated with health service use in general and a visit to the general practitioner \( (P = 0.06) \). Age was not significantly associated with physical injury \( (P = 0.95) \).

Seventy-two respondents (35.3%) reported a decline in functional status, 34 respondents (16.7%) reported a decline in social activities and 31 respondents (15.2%) reported a decline in physical activities as a direct consequence of the last fall. More than 90% of the respondents were less physically active for more than one week. More than 60% of the respondents who reported decline in functional status or social activity, reported a decline in more than one item.

Table 2. Consequences of the last fall in the year prior to the interview \( (n = 204) \)

<table>
<thead>
<tr>
<th>Consequences of falls</th>
<th>Total ( (n = 204) )</th>
<th>Females ( (n = 112) )</th>
<th>Males ( (n = 92) )</th>
<th>( P )-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical consequences</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any physical injury</td>
<td>139 ( 68.1 % )</td>
<td>88 ( 78.6 % )</td>
<td>51 ( 55.4 % )</td>
<td>&lt;0.001*</td>
</tr>
<tr>
<td>Fracture</td>
<td>7 ( 3.4 % )</td>
<td>3 ( 2.7 % )</td>
<td>4 ( 4.3 % )</td>
<td>n/a</td>
</tr>
<tr>
<td>Open wound</td>
<td>60 ( 29.4 % )</td>
<td>33 ( 29.5 % )</td>
<td>27 ( 29.3 % )</td>
<td>0.93</td>
</tr>
<tr>
<td>Bruising/extravasation of blood</td>
<td>87 ( 42.6 % )</td>
<td>60 ( 53.6 % )</td>
<td>27 ( 29.3 % )</td>
<td>&lt;0.001*</td>
</tr>
<tr>
<td>Sprain</td>
<td>5 ( 2.5 % )</td>
<td>3 ( 2.7 % )</td>
<td>2 ( 2.2 % )</td>
<td>n/a</td>
</tr>
<tr>
<td>Distortion</td>
<td>2 ( 1.0 % )</td>
<td>1 ( 0.9 % )</td>
<td>1 ( 1.1 % )</td>
<td>n/a</td>
</tr>
<tr>
<td>Brain injury</td>
<td>3 ( 1.5 % )</td>
<td>2 ( 1.8 % )</td>
<td>1 ( 1.1 % )</td>
<td>n/a</td>
</tr>
<tr>
<td>Muscle</td>
<td>7 ( 3.4 % )</td>
<td>4 ( 3.6 % )</td>
<td>3 ( 3.3 % )</td>
<td>n/a</td>
</tr>
<tr>
<td>Pain</td>
<td>10 ( 4.9 % )</td>
<td>6 ( 5.4 % )</td>
<td>4 ( 4.3 % )</td>
<td>n/a</td>
</tr>
<tr>
<td>Health service use</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any health service use</td>
<td>48 ( 23.5 % )</td>
<td>32 ( 28.6 % )</td>
<td>16 ( 17.4 % )</td>
<td>0.06</td>
</tr>
<tr>
<td>General practitioner</td>
<td>43 ( 21.2 % )</td>
<td>29 ( 25.9 % )</td>
<td>14 ( 15.2 % )</td>
<td>0.06</td>
</tr>
<tr>
<td>Hospital</td>
<td>16 ( 7.9 % )</td>
<td>11 ( 9.8 % )</td>
<td>5 ( 5.4 % )</td>
<td>0.33</td>
</tr>
<tr>
<td>Rehabilitation</td>
<td>1 ( 0.5 % )</td>
<td>0 ( 0 % )</td>
<td>1 ( 1.1 % )</td>
<td>n/a</td>
</tr>
<tr>
<td>Nursing home</td>
<td>2 ( 1.0 % )</td>
<td>1 ( 0.9 % )</td>
<td>1 ( 1.1 % )</td>
<td>n/a</td>
</tr>
<tr>
<td>Home for the elderly</td>
<td>1 ( 0.5 % )</td>
<td>1 ( 0.9 % )</td>
<td>0 ( 0 % )</td>
<td>n/a</td>
</tr>
<tr>
<td>Help in household (external or partner)</td>
<td>7 ( 3.7 % )</td>
<td>4 ( 3.6 % )</td>
<td>3 ( 3.3 % )</td>
<td>n/a</td>
</tr>
<tr>
<td>Treatment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any treatment</td>
<td>35 ( 17.2 % )</td>
<td>23 ( 20.5 % )</td>
<td>12 ( 13.0 % )</td>
<td>0.16</td>
</tr>
<tr>
<td>Medication</td>
<td>21 ( 10.3 % )</td>
<td>15 ( 13.4 % )</td>
<td>6 ( 6.5 % )</td>
<td>0.10</td>
</tr>
<tr>
<td>Surgery</td>
<td>3 ( 1.5 % )</td>
<td>2 ( 1.8 % )</td>
<td>1 ( 1.1 % )</td>
<td>n/a</td>
</tr>
<tr>
<td>Physiotherapy</td>
<td>13 ( 6.4 % )</td>
<td>9 ( 8.0 % )</td>
<td>4 ( 4.3 % )</td>
<td>n/a</td>
</tr>
<tr>
<td>Walking aid</td>
<td>14 ( 6.9 % )</td>
<td>8 ( 7.1 % )</td>
<td>6 ( 6.5 % )</td>
<td>n/a</td>
</tr>
<tr>
<td>Decline in functioning</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any decline in functioning</td>
<td>76 ( 37.3 % )</td>
<td>54 ( 48.2 % )</td>
<td>22 ( 23.9 % )</td>
<td>&lt;0.001*</td>
</tr>
<tr>
<td>Decline in functional status</td>
<td>72 ( 35.3 % )</td>
<td>51 ( 45.6 % )</td>
<td>21 ( 22.8 % )</td>
<td>0.001*</td>
</tr>
<tr>
<td>Decline in social activities</td>
<td>34 ( 16.7 % )</td>
<td>26 ( 23.3 % )</td>
<td>8 ( 8.7 % )</td>
<td>0.008*</td>
</tr>
<tr>
<td>Decline in physical activities</td>
<td>31 ( 15.2 % )</td>
<td>24 ( 21.4 % )</td>
<td>7 ( 7.6 % )</td>
<td>0.007*</td>
</tr>
</tbody>
</table>

\* \( P < 0.05 \), difference between men and women.

n/a = not applicable; Chi square test was only performed if each cell consisted of at least five respondents.
As a direct consequence of their last fall, 20 respondents (9.8%) had a decline in functional status, social activities and physical activities, while 76 respondents (37.3%) had a decline in at least one of these levels of functioning. Women reported decline in functioning significantly more often than men ($P<0.05$). Age was not significantly associated with decline in functioning ($P>0.05$).

**Risk factors for falls with consequences**

No significant interaction terms between gender, age or recall period and potential risk factors were identified in the associations between the potential risk factors and health service use and functional decline as a consequence of falling ($P>0.01$).

No significant associations were found between potential risk factors and health service use needed after falling. Additional adjustment for age, sex and other confounding factors did not change the associations (data not shown).

Table 3 shows the associations between potential risk factors and functional decline as a consequence of falling after adjustment for age and sex. Female gender was significantly associated with all measured consequences of falls. A decline in functional status or social activities as a consequence of falling was reported more often in subjects with increasing medication use. Other variables that were significantly associated with at least one of these consequences of falling were a higher depression score, low physical activity, poor physical performance and falls inside.

Table 4 shows the fully adjusted relationships for those fall risk factors that were significantly associated with falls with consequences after adjustment for age and sex. After additional adjustment for those potential confounding factors that changed the beta with at least 10% (see Table 4), female gender was significantly associated with a decline in functional status and physical activities as a consequence of the last fall. A decline in functional status, social activities and physical activities was reported more often in respondents with a higher depression score. Furthermore, a decline in functional status after falling was significantly associated with higher medication use, whereas a decline in social activities after falling was significantly associated with falls inside. Similar associations were found using the pre-established cut-off...
Discussion

This study examined a variety of consequences of falling in older people. Furthermore, this is the first study that determined which characteristics distinguish fallers who used health services or suffered functional decline as a consequence of falling from those who did not.

In agreement with other studies [1–3, 5–7], we observed that a majority of the respondents suffered physical injury and ~6% suffered major physical injury as a consequence of falling. In line with Campbell et al. [4], almost one-quarter of the respondents sought medical help after falling. However, in other studies only 10–15% of the respondents required medical help [12, 13]. It is difficult to compare these results, because the other studies did not report the type of health service use that was used after falling. Our study showed that most respondents went to a general practitioner or to a hospital. A few respondents needed rehabilitation, were admitted to a nursing home or home for the elderly, or needed help in the household. Little information is available on the kind of treatment that was needed after falling. In our study, in most respondents medication was prescribed or changed (i.e. lower doses). Only a few respondents needed surgery. Of the respondents who needed treatment, almost 40% were referred to a physiotherapist and purchased a walking aid because of their last fall. These consequences of falling support findings of other studies, which showed that healthcare costs associated with fall injuries were high [10, 11].

The current study shows that falls could also have consequences on the level of functioning in older people: respondents reported a decline in functional status (35.3%), a decline in social activities outside the house (16.7%) and physical activities (15.2%) as a direct consequence of the last fall. Respondents who reported a decline in social activities outside the house might still be socialising inside the house. Hill et al. [12] also showed that the level of physical activity decreased by ~15% as a consequence of falling. Nevitt et al. [5, 6] found higher percentages (25–42%), but these studies measured decline in normal activities after the last fall, which includes more than physical activities only.

It is important to prevent falls in general. However, it is particularly important to prevent those falls that have sequelae. Therefore, it is necessary to determine risk factors for falls with consequences. Various studies identified risk factors for physical fall injuries in community-dwelling older people, including female gender, cognitive impairment, neuromuscular impairment, balance and days of limited activity [2, 5, 7, 17]. Risk factors for falls necessitating medical help might be useful, but no risk factors were found for health service use as a consequence of falling. Some investigators found an association between fall history and hospitalisation or nursing home admission [19–21, 38], but did not examine risk factors for health service use among fallers. Future studies might examine risk factors for different types of health service use among fallers.

Falls and injurious falls appear to be independent risk factors for functional decline [18, 21, 38]. The current study indicates that female gender, higher medication use, higher depression score and falls inside are associated with decline in functioning as a direct consequence of falling. Some of the observed risk factors, i.e. medication use and depression, might be modifiable and can therefore be used in intervention strategies. In controlled clinical trials it should be tested whether prevention or treatment of these factors can reduce the total number of falls and falls with consequences. It should be noted, however, that the data of the current study do not indicate whether women really suffered or only reported more consequences of falling than men. Further research with more objective outcome variables, instead of data based on self-report, could make this point more clear.

Several other studies also reported an association between female gender, medication use, depression and falls or fractures [1, 2, 7, 39]. So far, no other study found that falls inside were associated with falls or injurious falls, but most studies did not include this potential risk factor. In future research, it can be assessed why falls inside the house may lead more often to injurious falls. Although age was a risk factor for injurious falls in various studies [13, 40], the current study did not confirm that age was a risk factor for health service use or functional decline as a consequence of falling. Similarly, when dichotomising age (<80 versus ≥80 years) no significant associations were found (data not shown).

The current study has several limitations. First, the consequences of falls were assessed retrospectively. A longer recall period could have resulted in an underestimation of the consequences of falls. However, no difference was found in the fall consequences between respondents who had their last fall within 3 months or >3 months before the interview. Moreover, the recall period was not a significant effect modifier. Secondly, only the consequences of the last fall were assessed. Thirdly, the study may not represent an average population of fallers, which limits the generalisability of the study. Fourthly, all measures of the consequences of falls were derived from self-reports, which could have led to misclassification. Moreover, as this is the first study that assessed functional decline, decline in social and physical activities as a direct consequence of falling, no validated questionnaires were available for the assessment of direct consequences of falling. It should be noted that a validated questionnaire on functional status was modified for the current study. Fifthly, the present study was not designed to determine mechanisms linking the risk factors to falls with consequences.

In conclusion, falls can have severe consequences, which may place heavy demands on healthcare systems. A quarter of the respondents needed medical help after their last fall. The results show that, besides physical injuries, a fall can also have an effect on the level of functioning. No risk factors for health service use could be identified among fallers. Female gender, higher medication use, depression and falls inside the house were significantly associated with a decline in the level of functioning as a consequence of falling. Some of the risk factors we found, i.e. medication use and depression, might be modifiable and can therefore be used in intervention strategies.
Key points

- Besides physical injury, a fall can also have an effect on the level of functioning.
- A quarter of the community-dwelling older people needed medical help after their fall.
- Female gender, higher medication use, depression and falls inside were significantly associated with a decline in the level of functioning as a consequence of the last fall.
- Some of the identified risk factors might be modifiable and can be used in intervention strategies.

Acknowledgements

The authors thank Jan Poppelaars, Mariëtte Westendorp and the research nurses Betty Cox, Ida Gelderman, Eva Stokx and Marjanne Kostman for their help in collecting and processing the data. The study is based on data collected in the context of the Longitudinal Aging Study Amsterdam (LASA), which is funded by the Ministry of Health, Welfare and Sports of The Netherlands. The study on the consequences of falls was supported by ZonMw, The Hague.

References

Clinical significance of cerebral white matter lesions in older Asians with suspected dementia

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Abstract

Background: cerebral white matter lesions are commonly seen on neuroimaging in older people and have been associated with clinical features such as gait abnormalities, urinary incontinence and depression. The significance of cerebral white matter lesions in older people with dementia remains uncertain.

Objectives: to study the association between cerebral white matter lesions and the presence or absence of dementia in a group of elderly Asian patients; and to determine the clinical significance of cerebral white matter lesions in patients who are diagnosed to have dementia in terms of associated clinical features and the impact of cerebral white matter lesions on cognitive status.

Methods: for the first objective, the records of 141 older people of Asian ethnicity presenting to a memory clinic for the evaluation of suspected dementia were reviewed to compare the prevalence of cerebral white matter lesions in patients who did not fulfil the criteria for dementia, patients diagnosed to have Alzheimer’s disease and patients diagnosed to have vascular dementia. For the second objective, 115 of these patients who were diagnosed to have dementia were studied to determine if demented patients with cerebral white matter lesions were more likely to have urinary incontinence, Parkinsonism, depression and greater severity of dementia. In addition, a comparison was made between demented patients with cerebral white matter lesions and those without cerebral white matter lesions in terms of psychometric assessment scores.

Results: cerebral white matter lesions were more common in Asian patients with vascular dementia. Demented patients with cerebral white matter lesions were also found to have more severe dementia and greater functional disability.