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Exploring the relationship between fear of falling and neuroticism: a cross-sectional study in community-dwelling women over 70

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Abstract

Background: fear of falling in older adults has been associated with generalised anxiety and may lead to avoidance of activities, with a further negative impact on future falls. Individual differences in personality associated with anxiety have not been previously examined in relation to fear of falling. Current assessment measures and interventions designed to reduce fear of falling in older adults do not take into account perceptions of anxiety associated with individual differences in personality.

Aim: to determine whether the core personality trait dimension of neuroticism can predict fear of falling in a community-dwelling sample of women ≥ 70 years of age.

Methods: cross-sectional data from 1,691 UK, community-dwelling female participants aged ≥ 70 years were examined using multiple and logistic regression analysis. Fear of falling was measured on a 6-point Likert scale. Neuroticism was measured using the Eysenck personality inventory.

Results: the significant independent odds ratios (OR) of predicting fear of falling were: neuroticism (OR 1.47 per SD increase, $P < 0.001$), history of falling (OR 1.57, $P < 0.001$), experience of fracture (OR 1.78, $P = 0.014$), need to use both arms to push up to rise from a chair (OR 1.56, $P = 0.001$), poor subjective general health, as measured by the SF12 (OR 1.63 per SD decrease, $P < 0.001$) and living alone (OR 1.31, $P = 0.031$).

Conclusions: neuroticism seems to be an important psychological factor in the experience of fear of falling in community-dwelling older women. It may be relevant for inclusion in current assessment measures and for consideration in the design of interventions to reduce fear of falling.

Keywords: *fear of falling, personality, anxiety, elderly*

Background

Falls are the leading cause of mortality from injury and a major contributor to disability in the UK [1]. The proportion of elderly people experiencing at least one fall over a 1-year period has been estimated as between 28 and 35% in the those aged 65 years [2, 3] and between 32 and 42% in those aged 75 years

[4, 5]. Fall-related injuries in older people cost in the region of £908 million, 63% of these occurring in the over 75 age group [1]. A total of 86,000 hip fractures occur annually, with 95% of these as the result of a fall, at a cost of £1.7 billion [6]. In the first month after fractured femur, the standardised mortality ratios in England for women aged over 65 were found to be 16 times higher than the same age group in the general

population [7]. Fall prevention in elderly populations has become an important area for research and practice. Currently, risk is assessed primarily on physical risk factors, with emphasis on neurological and functional abilities [8, 9].

With such serious consequences, it is easy to imagine why people with physical risk factors or previous fall history may develop a fear of falling. Some people define themselves not as fearful, but rather as 'worried' about falling [10]. The impact of this fear often leads to avoidance of activities [11] which in turn has been associated with the transition to physical frailty, resulting in a pattern of fear, falls and increased frailty, completing a cyclical pattern of deterioration, social isolation and decreased quality of life [12, 13]. Although the primary focus in fear of falling is related to physical factors, there may be psychological variables that contribute to variance in fear of falling. Fear of falling is associated with lower quality of life [14], poor subjective health rating [11], generalised anxiety [15] and depression [13]. However, these factors do not always account for the persistence of fear of falling, and there is a group of people who have attended intervention programmes and who fail to gain long-term benefits.

Falls and fear of falling are correlated [11, 12, 14, 16–18]; however development of fear of falling is not exclusive to the population of elderly people who have experienced a fall. There is a population of elderly people who are fearful of falling even when they have not actually experienced a fall [4, 15, 19]. Increasingly, there is a move to challenge a misconception that fear of falling is the result of the normal ageing process [20], and it is suggested that fear of falling is a pervasive, more serious problem in older adults than falls [20, 21].

Epidemiological studies have reported that between 21 and 65% of community-dwelling older and elderly adult experience fear of falling to some degree [12]. Prevalence of fear of falling in older adults who live independently and who have not experienced a fall has been reported as between 12 and 65% [11, 14, 15, 17, 19].

Demographic and social variables associated with fear of falling are increasing age, being female, living alone and having few social contacts [12, 22].

A neglected area of study is the psychological model which addresses the possibility that underlying individual differences in personality may be one factor that can account for fear of falling. Current instruments used to measure fear of falling and intervention programs implemented to manage fear of falling concentrate on physical health and do not appear to take into account individual differences in personality. One such personality trait, neuroticism, is associated with perceptions of anxiety, worry and feeling tense [23, 24]; yet there appears to be no account taken of the potential role of neuroticism in current instruments that measure fear of falling or programmes for management of fear of falling. This study aimed to determine whether neuroticism is a contributory factor to fear of falling in a UK, community-dwelling, female population aged (70 years in order to inform interventions that might better suit this particular group of elderly people.

Design

This was a cross-sectional survey study using a self-report postal questionnaire. Women had been initially identified and mailed from their GP surgery in the context of a trial of hip protector devices. Figure 1 demonstrates the recruitment pathway of the cohort.

Methods

The participants were 1,691 community-dwelling females aged ≥ 70 years, contacted as part of a trial of hip protectors in primary care [25] (mean age 77.5 SD 4.76). This cohort of women had declined to take part in the trial but agreed to take part in other subsequent studies. Twenty-four months after the initial contact period, these women completed and returned a follow-up risk factor questionnaire.

The risk factor questionnaire

The questionnaire, as well as collecting data on the four Study of Osteoporotic Fractures (SOFr) risk factors [26], also asked about whether the participant had fallen in the last 12 months and their self-reported health status (i.e. excellent, good, fair or poor). In addition, information about current medication, both those prescribed by their doctor and those purchased by themselves over the counter. While there are widely acknowledged instruments to measure fear of falling [14, 27, 28], a recent study demonstrated that the predictive validity of each instrument in relation to frequency of falls, limitation of activity and frequency of leaving the home is poor. No individual tool was found to predict these characteristics [29]; therefore, fear of falling was measured using a 6-point Likert scale item which asked how worried they had been about having a fall in the last 4 weeks (ranging from none of the time to all of the time).

The personality trait of neuroticism was measured using the Eysenck personality inventory [30]. This is a widely used scale which has been extensively validated in many populations and is designed for self-completion.

Logistic regression analyses were used to identify independent predictors for fear of falling. A second *a priori* hypothesis was that those with a higher level of neuroticism would experience increased levels of fear of falling. In order to examine this, the cohort were divided using their neuroticism score. Neuroticism score was recorded into four categories: a score of 0–7 = low neuroticism, a score of 8 = mean neuroticism score, a score of 9–16 = median neuroticism and a score of 17–24 = high neuroticism.

Results

Of the 7,267 women mailed to, 3,300 women returned their questionnaires, giving a 45% response rate. However, complete data were only available for 1,691 participants. Table 1 summarises the descriptive statistics for the main variables examined.

Fifty-nine per cent described experiencing some degree of fear of falling and 27% of participants had experienced a fall. The mean neuroticism score of 8.4 in the sample indicated a low mean level of neuroticism in this

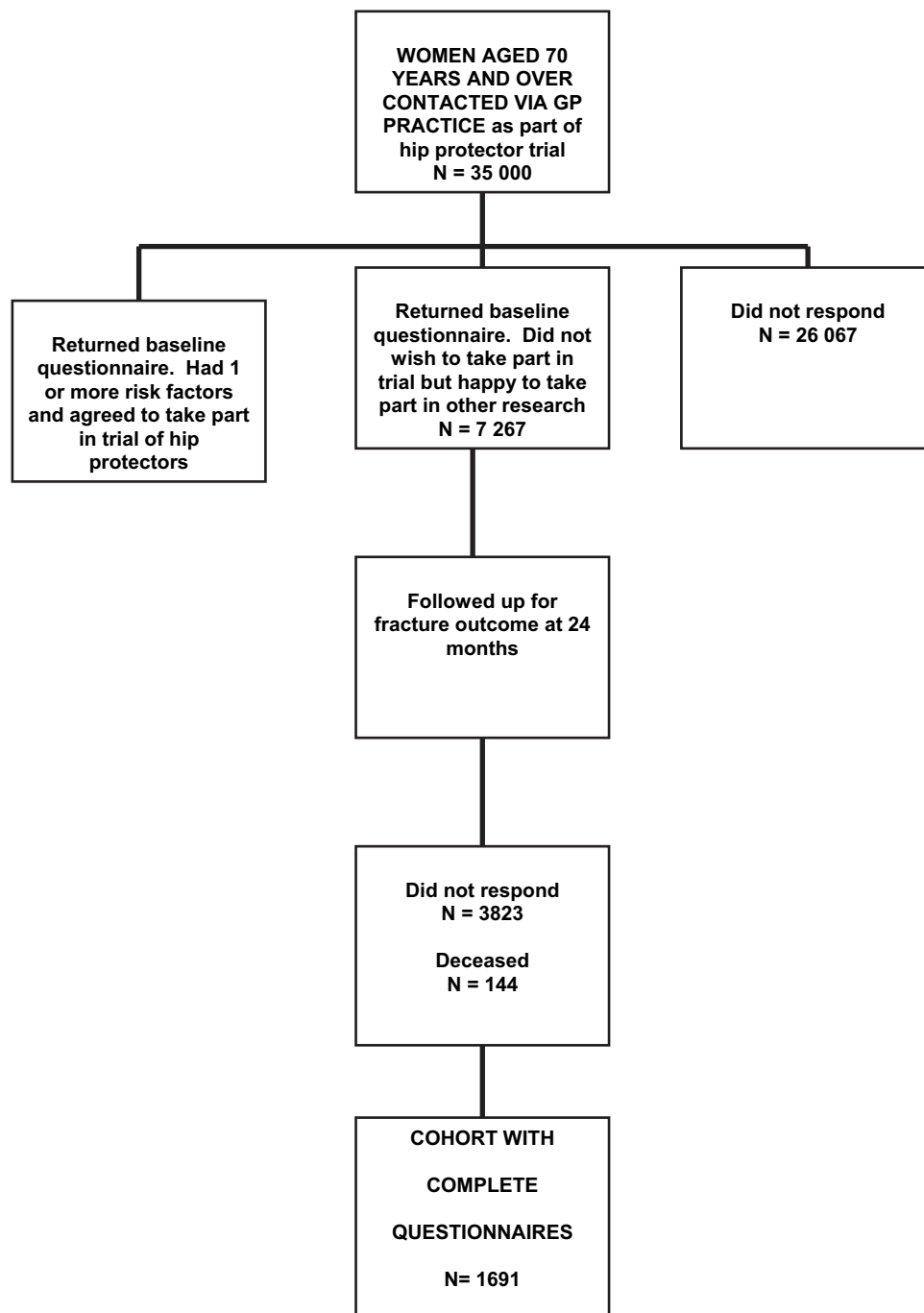


Figure 1. Flowchart showing recruitment of participants into the study.

community-dwelling female population, compared to a mean neuroticism score of 12.74 previously measured in a population of the same age range [30].

The significant independent odds ratios (OR) of predicting fear of falling were: neuroticism (OR 1.47 per SD increase, $P < 0.001$), history of falling (OR 1.57, $P < 0.001$), experience of fracture (OR 1.78, $P = 0.014$), need to use both arms to push up to rise from a chair (OR 1.56, $P = 0.001$), poor subjective general health, as measured by the SF12 (OR 1.63 per SD decrease, $P < 0.001$) and living alone (OR 1.31, $P = 0.031$).

Factors, which did not predict fear of falling in community-dwelling females, were age, number of medications and number of medical conditions.

These data were reanalysed to examine whether an increased level of neuroticism, indicated by an increase in neuroticism score, is associated with increased odds of experiencing fear of falling.

The predictor variable neuroticism was recorded into four categories based on participant score: a score of 0–7 = low neuroticism, a score of 8 = mean neuroticism score, a score of 9–16 = median neuroticism and a score of

Table 1. Descriptive statistics for the sample

	<i>n</i>	Mean	Median	Standard deviation
Age	1,680	77.5	76.0	4.76
Number of falls	1,690	0.45	0	0.92
Number of medications	1,691	3.34	4.0	2.41
Number of medical conditions	1,691	1.65	1.0	1.24
SF12 physical component	1,584	43.76	44.81	12.18
SF12 mental component	1,584	46.18	47.17	6.69
Neuroticism	1,691	8.36	8.0	4.12

Table 2. Descriptive statistics of neuroticism categories

	<i>n</i>	%
Low neuroticism	795	47
Mean neuroticism score	180	10.6
Median neuroticism score	648	38.3
High neuroticism score	68	4
Total	1,691	100

17–24 = high neuroticism. Table 2 summarises the descriptive statistics for each category of neuroticism score.

Women with a higher level of neuroticism were more likely to experience fear of falling (OR 3.3).

Conclusions

Neuroticism along with several other previously identified variables was confirmed as risk factors for fear of falling including previous falls and fractures, living alone, poor general health and having to use both arms to rise from a chair. In addition, women with higher neuroticism scores are more likely to experience fear of falling. Previous studies have found that increasing age is a significant predictor of fear of falling; however this study failed to find an association between age and fear of falling. This implies that more specific physical, social and psychological factors may be relevant.

Currently, there is no account taken of the role of individual differences in personality in measurement tools used to identify older people with fear of falling. The use of a neuroticism measure may help to identify individuals who have a persistent fear of falling which is unresponsive to interventions to address this. These may be a group of people who are likely to continue to limit their activity to reduce their fear and thus are in danger of becoming increasingly frail and at risk for fractures and falls. It may also explain why current interventions to reduce fear and falls often fail to produce lasting reductions in fear of falling in some people as neuroticism is conceptualised as a fixed personality trait measure and unlikely to change.

While this study is somewhat limited in that causation cannot be inferred from such a cross-sectional design, this examination of personality has demonstrated a clear relationship between fear of falling and neuroticism and may explain why fear of falling is not always related to experience of falls or physical risk factors. Those highest in neuroticism may limit activity most. There was a weak asso-

ciation between the number of falls and neuroticism, and this may be explained by other core personality traits such as extroversion which is characterised by impulsivity.

The current focus of fear of falling interventions is mainly related to physical health, exercise, stamina and balance capability. In the case of an individual with a high level of neuroticism, these may be limited in their effectiveness. The idea that a factor such as neuroticism may be implicated in a persistent fear of falling might, at first, seem a bleak prospect for targeting interventions for change. However, there are areas which can be usefully addressed and warrant closer investigation.

First, the confirmed link between neuroticism and depression may need to be addressed. Any attempt to motivate people to change behaviour is unlikely to succeed with depressed individuals, and depression may need to be addressed before successful behaviour change can be achieved.

Second, a more useful approach in those with high neuroticism may be to stress the negative health outcomes of limiting activity rather than concentrating purely on the consequences of falls. This information is likely to appeal to their neuroticism and may motivate them to continue to be active.

The role of personality in addressing changes in health behaviour is often ignored but should be examined and integrated into interventions which attempt to reduce fear of falling.

Limitations of this study are that it relies on cross-sectional data and is limited to a female community-dwelling population. Participant bias may well have occurred, in that the women in this study were those women who declined to take part in the hip protector trial and may therefore differ significantly, compared to those who took part in the hip protector trial. Attitudes and experience related to the concepts of worry, falls and fear of falling associated with personal risk may therefore differ significantly in this population of older women. Levels of trait neuroticism may also significantly differ in these different populations. The authors were unable to collect data from women who declined to take part as this was an opt-in study design, and no further contact with the population who did not respond was possible.

In addition to the problems associated with response bias associated with the non-responder group and the cross-sectional design of the study, the authors also acknowledge that there are additional problems associated with the reliability of self-report data. The study is also limited to a community-dwelling sample of elderly women. The generalisability of the findings should therefore be established in a wider elderly population.

The current recommendations for interventions are for individualised assessment [31], and despite the limitations of our design and response group, neuroticism may prove to be a useful addition not previously acknowledged in this process. Future work is required to determine whether neuroticism can independently predict falls and whether the introduction of the examination of such a trait has an impact on the future effectiveness of falls and fear of falling interventions.

Key points

- Current assessment measures and interventions designed to reduce fear of falling in older adults do not take into account perceptions of anxiety.
- There is a link between the personality trait neuroticism and fear of falling.
- Effects of interventions to reduce fear of falling may be improved by the inclusion of personality assessments.

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