Research Discussion Paper 12

Falls in older people with sight loss: a review of emerging research and key action points

Published by Thomas Pocklington Trust June 2013

This publication offers a summary of what is known about falls and falls prevention amongst older people with sight loss. It draws on recent research, including a review of qualitative research commissioned by Pocklington from Claire Ballinger at the University of Southampton and a forthcoming (2013) Cochrane Review led by Dawn Skelton at the Glasgow Caledonian University.

It explores the implications of research findings for action to address and reduce the risk of falls among older people with sight loss and suggests key issues for health and social care professionals to consider when working with older people, many of whom may have sight loss, and for sight loss specialists to consider when addressing individuals' risks of falls.

Background

Falls are the most common cause of hospitalisation for people aged over 65 and the leading cause of death from injury among people aged over 75 (NICE 2004). We know from a large body of research that falls in older people result from multiple risk factors including: increasing age, previous history of falling, gait and balance problems, mobility limitations, fear of falling, multiple medications, environmental/ home hazards and visual impairment. People in residential care and nursing homes are at an increased risk of falls (van der Pols et al. 2000).

What is not so widely known is that older people with sight loss are much more prone to falls than their sighted peers. The risk of injury from falls is nearly twice as high (1.7 times) and the rate of hip fractures is also nearly twice (between 1.3 and 1.9 times) as high (Legood, Scuffham & Cryer 2002).

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Housing and support for people with sight loss

There are almost two million people living with sight loss in the UK, most of whom are older: 1 in 5 people aged 75 years and 1 in 2 aged 90 years or over is visually impaired.

The most frequent causes of sight loss in the UK are related to age: macular degeneration (MD), cataract and refractive error.

The cost of falls associated with sight loss

RNIB (Boyce 2011) estimated that the cost to the NHS of falls associated with sight loss is at least £25.1 million per annum.

RNIB used the following equation to calculate the costs to the NHS in a local area:

- 8% of falls that result in hospital admissions occur in individuals with sight loss and these cost 21% of the total NHS cost of treating accidental falls;
- 3.8% of falls resulting in hospital admissions could be attributed to sight loss and these cost 10% of the total NHS cost of treating accidental falls.

These are reasonable calculations to make and are probably an under-estimate.

There is no hard evidence to show that action on sight loss will result in fewer falls or lower costs to the NHS - we cannot assume that everyone with sight loss will fall, or that every fall results in costs to the NHS - but the devastating impact of falls on people's lives is well documented (NICE 2004) and this publication shows that people with sight loss are at a high risk of falling.

Where do most falls happen?

The most serious accidents involving older people usually happen on the stairs or in the kitchen (RoSPA 2002). Falls on stairs usually happen as a result of a combination of factors, and most occur when going down stairs as a result of over-stepping rather than slipping (Hill et al. 2000). Overstepping may because stair edges are not seen easily or are misjudged by people with sight loss (Hill et al. 2000) because perception of the depth of steps and sensitivity to 'distant-edge-contrast' are affected by sight loss and are important for maintaining balance and detecting and avoiding hazards (Lord & Dayhew 2001).

Adequate lighting can make steps, stair edges and other hazards easier to see (Percival, 2007; Thomas Pocklington Trust 2013).

What research tells us about sight loss and falls among older people

There is a considerable body of evidence showing that older people with sight loss are more likely to fall than their sighted peers. Dhital, Pey and Stanford (2010) summarised research findings on sight loss and falls and where research is needed and indicated that gaps remain in our knowledge about the relationship between falls and sight loss.

The majority of research on visual impairment and falls has concentrated on visual acuity, contrast sensitivity or visual field loss in general. There is little research linked to particular eye conditions such as macular degeneration or glaucoma. Because the cause of falls is often poorly recorded in the NHS, research into links between sight loss and falls and the development of preventative action is hampered by lack of evidence. A 2007 UK survey found that only half of falls clinics assessed vision (Lamb et al. 2007).

Awareness of sight loss among researchers investigating why older people fall may be limited. A recent article in The Lancet on how and why falls occur in older people was criticised for not mentioning visual impairment or gait disorders as possible factors (Zheng 2013).

Causes of sight loss

Loss of visual acuity increases with age to 42% of those aged 85 and older (Attebo, Mitchell & Smith 1996).

Refractive error may lead to a person needing different spectacles for different tasks. It is sometimes the case that spectacles get mixed up and reading spectacles are used for walking or vice-versa.

The use of multi-focal glasses is a risk factor for falls: people who wear multi-focals are more than twice as likely to fall as non-multi-focal wearers, and this risk increases when negotiating stairs (Johnson et al 2007; Lord, Dayhew & Howland 2002; Timmis et al. 2010; **http://profane.co/vision-and-falls-prevention-infographic**/). A contributory factor to this risk may be that some opticians give advice that compounds it. Buckley and Elliot (2006) found that "Optometrists typically encourage patients who wear multi-focals to tuck their chin in when stepping over kerbs or going up or down stairs so that they can look through the top part of

their spectacles, which provides a distance vision correction so that obstacles will be in reasonable focus. Our own research has shown that head flexion significantly increases postural instability".

Several studies suggest that changes in lens prescription can have a dramatic impact on adaptive gait, particularly when stepping and on stairs (Elliott & Chapman 2010), and that large and sudden changes in refractive correction should be avoided.

Women with MD fall at nearly twice the rate of women without MD (Szabo et al. 2008). Wood et al (2011) found that reduced contrast sensitivity was the strongest predictor of increased rates of falls and other injuries and highlighted the importance of contrast sensitivity screening.

The incidence of visual field loss also increases with age. The Salisbury Eye Evaluation, which surveyed 2374 people between 65 and 84 years, found that peripheral visual field loss was the primary component that increased the risk of falls (Freeman et al. 2007), probably because of its effect on postural stability and the ability to manoeuvre around objects. Hence, people with glaucoma were found to have three times the risk of falls compared to those without glaucoma (Haymes et al. 2007). Black and colleagues (2008) also found that postural instability may contribute to the increased risk of falls among older people with glaucoma.

Diabetic retinopathy has not been studied in relation to falls in older people. However the combination of diabetes, ageing and falls has been termed the "troubling triad" (Crews et al. 2013) because, regardless of sight loss, people with diabetes may have poor balance control, foot problems and poor glycaemic control that affects their risk of falls (Nelson, Dufraux & Cook 2007).

The importance of vision to good balance and movement

Vision helps coordinate and plan movement; it is fundamentally involved in gait, balance and stability. Research shows that people with sight loss adopt different or unsafe gaits, such as stepping too high or far over a step or hazard, which is likely to lead to increased risk of falling, particularly when avoiding obstacles and negotiating steps and stairs (Buckley et al. 2005a; 2005b; 2010). Timmis & Pardhan (2012) found that people

with central visual field loss adopt a cautious stepping strategy in an attempt to reduce the risk of tripping or falling.

Wang and colleagues (2012) found that between 40-50% of older people with sight loss limit their activities due to a fear of falling. Non-activity affects muscle strength, which makes falls more likely, and so completes a vicious circle. Research (Lamoureux et al 2010) has found that people with sight loss who did not take part in physical activity were likely to fall.

22% of people over 60 in the UK have visual and hearing impairment (Davis & Davis 2009). Kulmala and colleagues (2008) found that the risk of falls among people with sight loss was higher if the person also had hearing and balance impairments, probably because this prevented the reception of compensatory information about body posture and environment being received from these other sensory sources. Rantanen (2013) found that poor vision and hearing may increase the risk of declining mobility.

Behaviour plays a large part in many falls. Understanding the older person's perspective is critical if interventions to reduce the risk of falls are to be successful. For many, falls are perceived to be, at most, a distant future risk - people do not believe they are at risk of falling. We know that older people do things that may increase their risk of falling, e.g. leaving objects on stairs and using stairs in the dark (Haslam et al. 2002). Yardley et al (2006) found that "older people do not reject falls prevention advice because of ignorance of their risk of falling, but because they see it as a potential threat to their identity and autonomy. Messages that focus on the positive benefits of improving balance may be more acceptable and effective than advice on falls prevention."

The majority of older people fear falls and fractures and the effects these may have on their quality of life. Fear of falling limits activity and may increase social isolation and depression, which are almost twice as common among people with sight loss as their sighted peers, even for those without a history of falls.

Preventing falls in older people with sight loss

There is little hard evidence to show what prevents falls in older people with sight loss.

The most recent systematic review on falls prevention for older people found evidence to support: group and home-based exercise, interventions that tackled a range of factors and home safety assessment/ modification (Gillespie et al. 2012). Home safety assessments and modifications and a coping strategy programme delivered by an occupational therapist has been shown to reduce falls by 41% (**http://profane.co/vision-and-falls-prevention-infographic**/).

A Cochrane Review by Skelton et al (to be published in 2013) looked at the evidence for the effects of 'environmental and behavioural interventions for reducing physical activity limitation in community dwelling visually impaired older people' and found inconclusive and conflicting results and concluded that more research is needed.

There is a general issue about the "language" of falls and of old age: people who fall are perceived in negative terms to be old, frail and dependent and, perhaps, to have a drink problem. Targeting older people "at risk" of falls can provoke negative or no responses among people who do not relate to portrayals of older age. Studies suggest that older people are more likely to take up services and advice when the emphasis is on maintaining independence and mobility (Yardley et al. 2006).

Action on sight loss itself, such as early cataract removal, appears to reduce falls (**http://profane.co/vision-and-falls-prevention-infographic**/).

Assessing and recording sight loss in relation to falls

Falls clinics developed after the National Service Framework for Older People identified the need to address falls and their consequences amongst older people.

In 2007 a review of then current practice within falls prevention clinics indicated the variety of services provided and that assessment of vision was undertaken by just 58% of clinics, either informally (eg asking clients if they had problems with vision) or formally using an assessment tool (most often a Snellen chart) (Lamb et al 2007). Clinics commonly offered

patients information about a variety of subjects, including eye health and sight loss, but almost all relied on referring people to their optometrist or GP for an eye examination or eye health issues. In 2013 the College of Optometrists plans to investigate current practice on assessment of vision in falls clinics.

New NICE clinical guidelines on the assessment and prevention of falls in older people expected in 2013 will replace the previous guideline (NICE 2004). It is hoped they will include recommendations relating to the assessment of, and strategies for, addressing visual impairment, both in in-patient settings, and within the community.

Emerging themes: research informing practice

Preventable and treatable sight loss

In the UK we have a major problem of preventable and treatable sight loss in older people: RNIB estimate that at least half of sight loss is preventable. Research has shown that older people may be reluctant to take up eye examinations and may not seek new spectacles when their sight changes (Jessa and Evans, 2008; Iliffe et al, 2009).

For some people, aspects of treatable sight loss are not recognised because they are mistaken as the symptoms of other health conditions such as dementia which may cause loss of visual acuity, contrast sensitivity and colour vision, as well as poor spatial awareness and depth perception. We know that some of these factors are strongly associated with falls, yet a recent study (McKeefry and Bartlett, 2010) suggests that people with dementia may not have regular eye examinations.

Up to 60% of people who have a stroke have visual problems (Rowe et al. 2009). Despite this, a recent survey (Pollock, Hazleton & Brady 2011) found that the vast majority of stroke units in Scotland had no protocol for the management of visual problems.

A key step in reducing the risk of falls is to encourage older people to have regular eye examinations.

The most recent systematic review of the relationship between vision and the risk of falls (Salonen and Kivela, 2012) found that evidence that poor depth perception/stereoacuity and poor

low-contrast visual acuity are risk factors for falls "is quite convincing" but that more studies of the relationships between different aspects of sight loss vision and the risk of falls are required.

Factors to consider connected with sight loss

A growing body of evidence indicates that, in the context of falls, people with sight loss have some characteristics that differ from the sighted older population. We have already noted that stepping behaviour and gait can be different in people with sight loss and that a fear of falling may cause people to limit their activities, particularly if they have more than one sensory impairment. Crews and Campbell (2004) argued that older adults with poor vision may acquire unique falls risks associated with functional losses, such as reduced mobility because they no longer feel safe because of their visual impairment.

Assumptions have been made that falls prevention programmes which have been successful in the general older population should work with older people with sight loss. Given the lack of evidence for what works with this client group, it may be easier for commissioners to fall back on these tried and tested programmes, especially as they can be seen to be "evidence-based" and at a time when resources are limited in the NHS and social care. However, Steinman, Nguyen & Leland (2011) argue that we need to see a person's visual function as a dynamic system integrated with other aspects of their life and that falls prevention programmes must view visual impairment in that context. For example, poor vision could indirectly lead to losses in upper and lower limb strength by way of reduced physical activity which is associated with vision loss.

Different problems require different interventions to prevent falls among people with sight loss and must be designed to meet the needs, preferences and abilities of the individual. This should involve exploring the environment in which the person spends most of their time.

The Visually Impaired Persons (VIP) trial combined exercise and home safety programmes, both of which are known to be effective if targeted at people at risk of falls. It concluded that "the VIP trial results cast doubt on the assumption that strategies effective in reducing falls in older people with normal sight will necessarily 'work' in people with poor vision, and vice versa." (Campbell et al, 2005; Robertson & Campbell 2007).

Unique circumstances faced by older people with sight loss

There are factors in addition to the "mechanics" of sight loss which need to be taken into account in designing falls prevention programmes. Older people with sight loss face life circumstances that differ from their sighted peers, including anxiety, depression and social and economic exclusion (Nazroo and Gjonca 2005; Nazroo and Zimdars, 2010; RNIB 2012).

Importance of autonomy and personal choice

Life is tough for people with sight loss. They learn to draw on inner reserves such as self-reliance, resilience, stoicism and self-determination to meet challenges (Gosney et al. 2009; Cooper 2013). A qualitative study of the views and experiences of people with sight loss (Ballinger et al. 2009) reinforced the importance of autonomy and personal choice concerning decisions about their environment and risk. As Yardley's study found (2006), it is important for health professionals and carers to recognise this and support independence rather than focus on checking for unsafe or insecure features. People with sight loss want to reach decisions independently, particularly about factors affecting the home environment, "the epicentre of their mental map".

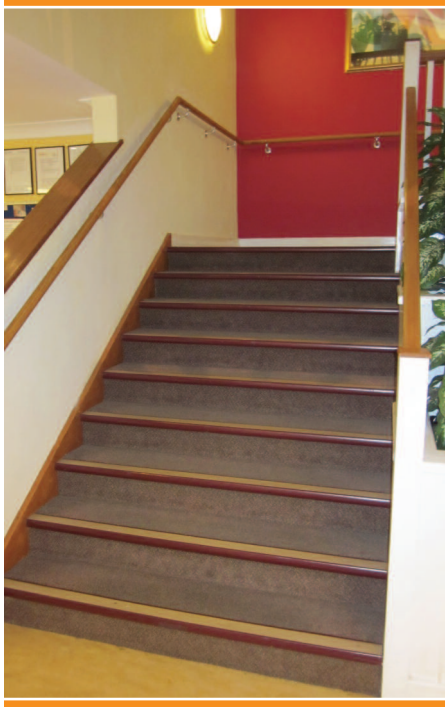
People with sight loss can view their environment in a different way than sighted older people. They may use items of furniture or rugs, for example, to provide "cues" to create a familiar path through their home or use table tops or backs of sofas to help their balance to move across a room safely. What may appear to a health professional as relatively small changes in furnishings can disrupt a familiar environment; choosing not to modify the home environment can be a good choice in terms of personal safety and reducing risk. Reluctance to move items of furniture can be a positive assertion, not recklessness. Interfering with the idiosyncratic relationships established over time between people with sight loss and their home environments can increase the risk of falls rather than prevent it (Pynoos, Steinman & Nguyen 2010).

Exercise and balance programmes for older people are usually designed for sighted people

Exercise is important for older people in order to retain muscle strength, particularly in relation to stairs where we know they are most at risk. However, exercise and balance programmes for older people are usually designed for sighted people. Instructors may rely on visual "cues" or on demonstrating movements, as in Tai Chi, for example (Steinman, Nguyen & Leland 2011).

Adapting houses

Making the treads of stairs more visible may reduce the risk for falls (den Brinker et al. 2005) and appropriate use of colour and contrast and lighting can make steps, stairs, hazards and other obstacles easier to see and negotiate (Thomas Pocklington Trust, 2011 and 2013).



Practice Recommendations

Unless new ways of working with people with sight loss are found, falls prevention programmes are unlikely to be effective for people with sight loss and gaps in our knowledge of what works will remain.

Local sight loss societies

Local sight loss societies can play a key role in highlighting the unique circumstances of people with sight loss in:

- falls clinics
- care homes and sheltered or extra care housing for older people
- stroke services
- leisure facilities and clubs
- clinical commissioning groups
- exercise and home safety programmes designed for (and with) people with sight loss
- housing improvement and management programmes.

Allied health professionals

- Join, and contribute case studies to ProFaNE, (http://profane.co/), an online community of healthcare professionals committed to the prevention of falls, which has a special section on vision and falls prevention.
- Develop client-centred decision making and raise awareness in falls clinics about the risks that sight loss poses for falls and the abilities and needs of people with sight loss and - conversely - raise awareness in sensory impairment and low vision services of the risks of falls (Ballinger et al 2009).
- Develop competencies in sight loss via effective training, coaching, and performance assessments.

Recommendations for research

There is an urgent need for robust research about the links between sight loss and falls, and for people with sight loss to be directly involved in informing research questions, such as:

– the effectiveness of environmental and behavioural interventions in reducing falls amongst older people with sight loss;

– the views and experiences of people with sight loss about falls prevention interventions;

– the perceived effectiveness and acceptability of general falls prevention strategies (i.e. designed for the general population of older people) among older people with sight loss;

– assessing whether increased mobility (and consequent improvements in strength, balance and confidence) reduces falls or if reduced activity reduces falls by lessening exposure to risk of falls (in the short term).

Useful research designs would employ randomised controlled trials and qualitative studies.

Margaret Martin
Medical journalist and independent researcher

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Thomas Pocklington Trust

Housing and support for
people with sight loss

Pier House
90 Strand on the Green
London
W4 3NN

Tel: 020 8995 0880
Email: info@pocklington-trust.org.uk
Web: www.pocklington-trust.org.uk

Published by Thomas Pocklington Trust
Registered Charity No. 1113729
Company Registered No. 5359336

ISBN 978-1-906464-53-0

9 781906 464530

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