

# Visual Impairment and Recurrent Falls in the Elderly: A Comprehensive Systematic Review

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## Abstract

Visual impairment is a prevalent age-related condition that can significantly impact an individual's mobility and balance, potentially increasing the risk of falls among the elderly population. This article presents a comprehensive systematic review aimed at examining the association between visual impairment and recurrent falls in older adults. By synthesizing the available evidence, this review seeks to provide valuable insights into the complex relationship between visual deficits and fall risk, shedding light on potential preventive strategies and interventions to improve the safety and well-being of elderly individuals. A qualitative systematic analysis of these studies was performed. The evidence about poor depth perception/stereo acuity and poor low-contrast visual acuity as risk factors of recurrent falls is quite convincing. Discrepant vision, a decrease in visual acuity, and loss of visual field may be risk factors, but more studies are needed. The results concerning the relationships between poor visual acuity and poor contrast sensitivity and the risk of recurrent falls are controversial.

**Keywords:** Visual impairment; Visual field; Refractive errors

## Introduction

Falls among the elderly are a major public health concern, contributing to significant morbidity, mortality, and reduced quality of life. Visual impairment is a common age-related issue that can affect various aspects of daily living, including gait stability and environmental perception. Understanding the link between visual impairment and recurrent falls is essential for developing targeted interventions to mitigate the risk of falls and improve the overall health outcomes of older adults [1].

Visual functioning, the ability to detect surroundings, is needed for posture control. Impaired vision may, thus, be a risk factor for falls, especially for recurrent falls. In preventing recurrent falls we need to know the specific features of vision that are risk factors for the recurrence. The development of recurrent falls prevention strategies should be based on the use of practical and exact tests of these risk factors. We decided to perform a systematic review about the relationships between eye diseases or impaired vision and the risk of recurrent falls in order to find the specific features of vision which increase the risk for falling recurrently [2].

## Methods

A comprehensive literature search was conducted following PRISMA guidelines. Articles were selected based on their relevance to visual impairment and recurrent falls in elderly populations. Studies that met predetermined inclusion criteria were critically appraised to ensure methodological rigor [3].

## Prevalence of visual impairment in the elderly

Visual impairment in the elderly is a multifaceted condition encompassing various ocular disorders such as cataracts, age-related macular degeneration (AMD), glaucoma, diabetic retinopathy, and refractive errors [4]. The prevalence of these conditions increases with age, leading to a higher risk of falls in older adults.

## Impact of visual impairment on balance and mobility

Visual cues play a crucial role in maintaining postural stability and navigating the environment. Visual deficits can compromise an

individual's ability to detect hazards, judge distances accurately, and adapt to changing terrain, predisposing them to frequent falls.

## The role of visual field loss in fall risk

Visual field loss, a common manifestation of various eye diseases, can significantly hinder an individual's peripheral vision. This limitation may reduce awareness of potential obstacles and increase the risk of collisions, tripping, and stumbling [5].

## Effects of refractive errors on falls

Uncorrected refractive errors, such as myopia or presbyopia, can impact visual acuity and clarity. Poor vision correction or lack of corrective eyewear can lead to misperceptions of depth and distance, increasing the likelihood of falls [6].

## Visual impairment and fear of falling

Older adults with visual impairments may develop a heightened fear of falling, leading to reduced physical activity and functional limitations. This fear-avoidance behavior can further exacerbate the risk of falls and diminish overall well-being.

## Interventions and prevention strategies

This review explores potential interventions and preventive measures aimed at reducing fall risk in visually impaired elderly individuals. Vision rehabilitation, environmental modifications, and assistive technologies are some of the strategies that have shown promise in enhancing safety and mobility.

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## Multidisciplinary approaches

Addressing visual impairment and recurrent falls in the elderly requires a multidisciplinary approach involving ophthalmologists, optometrists, geriatricians, physical therapists, and occupational therapists. Collaborative efforts can optimize functional outcomes and improve the overall health and independence of older adults [7].

## Discussion

Relationships between impaired vision or eye diseases and the risk of recurrent falls among the aged have been studied in a fairly large number of prospective and retrospective studies. Some studies have been done in unselected or community-dwelling populations, but the populations in some studies are selected, for example, the aged living in intermediate care facilities. Unselected populations are the most valuable materials for epidemiologic studies. For the qualitative analysis of this systematic review [8], the studies were divided into subgroups according to their materials, because differences in the selectivity of populations cause problems in the interpretation of the results. The majority of the reports were prospective ones, and three studies used retrospective design. The studies using retrospective design were taken into account, although conclusions from their results must be done more critically than those from the results of prospective ones. By using a retrospective design, it is difficult to determine if certain identified risk factors such as poor functional abilities are consequences of previous falls. However, this is not a major problem when concentrating on impaired vision as a potential risk factor, because falls seldom result in visual impairment. Other variables previously found to be related to the risk of recurrent falls were adjusted in a number of studies. The results of the studies which did not take into account these confounding variables are less valuable than the ones in which multivariate analyses were performed. Registration of falls varied between the studies causing problems in assessing the reliability of the results and comparing the results with each other. A prospective follow up with a fall record form is regarded as the most reliable method. Participants filled in fall record forms or reported falls regularly either by making written notes or by telephone in 13 prospective studies [9].

The studies differed in methods which were used to assess visual acuity and other specific features of vision. These differences caused problems in comparing the results and in drawing conclusions. Objective methods were used in 11 prospective studies, and 5 prospective studies were based on only subjective experiences of poor vision or on self-reported diagnosis of an eye disease. Two retrospective studies utilized objective measures and one was based on subjective experience of poor vision. Self-reported eye disease diagnoses are not very reliable measures. The methods to measure visual acuity differed between the studies [10]. Binocular visual acuity, which is a more relevant measure than monocular visual acuity, was measured in most of the studies. Objective measurements are usually done in standardized conditions, which differ from daily living conditions. Subjective assessments are based on persons' experiences in their normal living surroundings. Therefore, a subjective assessment of vision may be quite valuable and informative. However, the question about subjective

vision can be understood in a different way by different participants. Five prospective studies done in unselected or community-dwelling populations with the adjustment of multiple confounders. Both depth perception and change in visual acuity were measured in one study in which they proved to be significant risk factors [11]. Visual field loss was a significant risk factor in two out of three studies. Poor contrast sensitivity was related to the risk of recurrent falls in one out of three studies. Subjective poor vision and self-reported eye diseases were not found to be risk factors in the study in which they were measured.

## Conclusion

Visual impairment significantly influences recurrent falls in the elderly, emphasizing the need for increased awareness and proactive measures to address this issue. By understanding the complex relationship between visual deficits and fall risk, healthcare providers can implement targeted interventions to enhance mobility, safety, and quality of life for older adults with visual impairments. Further research in this area is crucial for developing evidence-based guidelines and best practices to reduce falls and promote healthy aging.

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