

Systematic Review

Hip fractures in the elderly should not be dismissed as bad luck – a sign of proactive visual consultation: an artificial intelligence-based systematic review

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ABSTRACT

Elderly persons with neglected visual problems face a heightened risk of fall and added mortality. Vision is essential for maintaining postural balance and spatial awareness. In order to prevent these falls, we need to know about the causative impaired vision patterns seen in these age groups. we decided to perform a systemic review using artificial intelligence (AI) based multiple tools, about the relationship between various causes of impaired vision in elderly and the risk of elderly hip fractures due to fall. We have conducted a comprehensive AI based research across multiple academic databases to identify research publications exploring the links between visual impairments, falls, and hip fractures among older adults. Studies were analysed based on the measure of vision or commonly reported eye diseases in elderly: refractive errors, cataract, glaucoma and macular degeneration, which were used as potential risk factors. This systematic review pooled data from 26 studies to evaluate the need for proactive ophthalmic consultation in elderly patients admitted with hip fractures. Visual assessment in older adults is essential to minimize fall-related complications and associated morbidity. Elderly's sustaining a fragility hip fracture have impaired vision, much of which is easily treatable and can be detected effectively with pro-active eye consultation.

Keywords: Eye disorders and hip fractures, Elderly fall Visual impairment and injuries

INTRODUCTION

Elderly persons with neglected visual problems face a heightened risk of fall and added mortality especially when elderly's are left alone for their day to day activities. Domestic falls are the leading cause of injury for adult's aged 65 years and above. It's been reported that almost one-third of these community dwelling people had a serious fall at least once a year.¹ Contrary to developed world, where the aged living in sheltered housing experience more falls than the home dwelling aged, domestic household falls are more common in India compared to old-age home falls.² This is probably due to round the clock care-taker availability in old-age homes.

Apart from physical injury, falls have a significant psychological issue associated with even a single fall, wherein elderly refuse to move in fear of recurrent fall adding to the morbidity. This opens a cascade of socio-economic consequences, leading to direct and in-direct financial burden on the society. Estimated cost in 2030 due fall related injuries is expected to be more than double compared to 2015 consensus in USA.³

Cause of fall is often multifactorial and due to interrelation of several extrinsic and intrinsic factors which helps us in categorizing elderly falls into broadly three groups. First one's are the falls that result from interference with support systems (like trips, slip of walking stick), second one's are

the falls that result from externally applied push or self-induced displacement like bending, reaching or turning while getting up from sitting position, and the third group comprises falls due to physiological event that disrupts postural control. Falls belonging to first and second group are usually accidental and require cross speciality consultations to extract the exact cause of fall.⁴

Vision is essential for maintaining postural balance and spatial awareness, so when there is even a mild loss of vision, it can significantly increase the risk of falls due to limited ability to detect and respond to obstacles or changes in terrain. Impaired vision is an important factor contributing to recurrent falls which is categorized into group 1. In order to prevent these falls, we need to know about the causative impaired vision patterns seen in these age groups. Despite numerous publications, no systematic review/meta-analysis has attempted to clarify the available evidence linking eye diseases to fracture risk. The findings remain inconclusive, with some studies suggesting an increased risk of fractures in individuals with cataracts and others reporting conflicting results.^{5,6} Clinical significance of this association is still not fully understood, warranting further research to clarify the relationship between cataract and fracture risk. To address these issues, we decided to perform a systemic review using AI based multiple tools, about the relationship between various causes of impaired vision in elderly and the risk of elderly hip fractures due to fall, in order to find the specific visual impairment and to emphasize the importance of pro-active eye consultations for the elderly admitted for fall related hip injuries.

METHODS

Inclusion and exclusion criteria

We have conducted a comprehensive AI based research across multiple academic databases to identify research publications exploring the links between visual impairments, falls, and hip fractures among older adults. We have used the key words “eye disorders and hip fractures”, “elderly fall”, “visual impairment and injuries”.

On searching these key words on Google Scholar and ResearchGate on 26th Dec 2025, we come across 20500 papers, which is humanly impossible to analyse and review. So, we used SciSpace AI based software, through which we have identified 85 unique papers relevant to our topic of study. Only articles written in English which reduced the number to 78 were taken into consideration. Further, only retrospective longitudinal studies were accepted for further evaluation, reducing the count to 54. Critical reviews, prospective and cross-sectional studies were excluded. Only the studies with mean age population over 65 years or with youngest participant older than 60 years, if mean age was not mentioned, were included. 12 studies fail to meet the age criteria. Further only papers published in PubMed indexed journals were considered for final review reducing the count to 22 articles. Text of these 22 articles were screened and assessed by two authors, divided equally among them. Nine articles were further excluded as they consider the interventions and didn't analyse the association between visual impairment and risk of fall, or used hip fractures as an outcome measure. This brings us to total of 13 articles for analysis.

On same date, 2 different AI based software's PaperPal and Elicit, were also used following the steps of exclusion as mentioned, to retrieve the relevant studies of our interest. Initially PaperPal and Elicit had identified 112 and 96 studies respectively, relevant to our topic. However, it has filtered down to 19 and 34 articles at end. On reading articles filtered by SciSpace, we came to know that AI has not been able to exclude the articles which consider intervention as a measure of outcome. So, on 16th Jan 2026, further association specific search was done using additional key word “association” among the articles selected by PaperPal and Elicit, which actually saved the time in reading, and reducing the search to 11 and 25 articles respectively. However, on reading these articles, further 2 and 7 articles from each research based were excluded as they didn't meet our inclusion criteria related to association (Table 1). So, at end 13 articles from SciSpace, 9 from PaperPal and 18 from Elicit were selected.

Table 1: Study selection process.

Stage of screening	Records identified using AI software	SciSpace	PaperPal	Elicit
Initial identification	Articles relevant to topic	85	112	96
Language screening	Only articles published in English	78	98	87
Study design screening	Only retrospective longitudinal studies included; critical reviews, prospective and cross-sectional studies excluded	54	32	39
Age criteria screening	Mean age >65 years, or youngest participant >60 years (if mean age not reported)	42	21	35
Journal indexing screening	Only studies published in PubMed-indexed journals	22	14	29
Full-text assessment	Screened independently by two authors (GG, TG)	22	11*	25*
Final exclusion	9 studies excluded (not focused on association or used hip fracture as outcome)	13	9	18
Final included studies	Eligible for analysis	13	9	18

*Further association-specific search was performed using the additional keyword “association” among the shortlisted articles. PRISMA 2020 was used as assessment tool for analysis.

Six articles were common in these three AI extracted data bases. References list of all the articles were checked by both the authors and additional two articles were included in the study fulfilling the criteria, using snowballing method. 3 articles were excluded as we could not trace the full article based on the abstract selected. So, Total 26 articles were taken into final consideration for the study. Full text assessment of these 26 studies was done and they were classified based on the outcome variables into those presenting with first time fall (n=9) and those considering recurrent falls (n=17). This differentiation is important to delineate impaired vision as a risk factor for recurrent falls and stressed upon the ophthalmic consultations for elderly admissions for hip injuries. These studies formed the basis for this systematic review.

Internationally recognised web-based software PRISMA 2020 was used systematic analysis. Studies were analysed based on the measure of vision or commonly reported eye diseases in elderly: refractive errors, cataract, glaucoma and macular degeneration, which were used as potential risk factors. Measure of vision includes objective near/distant visual acuity which refers to ability to see finer details clearly at near or far distances and requires spectacles to improve clarity, low/ high contrast visual acuity which refers to ability to perceive details in low/ high light conditions, distant/ near contrast sensitivity refers to ability to distinguish between object and background. Also, the population has been categorized into whether they live in sheltered/ old-age homes and community dwelling population. Because in sheltered homes elderly are well taken care of due to round the clock availability of assistance and prophylactic health check-ups.

RESULTS

The present systematic review demonstrates a consistent association between visual impairment and an increased risk of falls and hip fractures among older adults. Across the included studies, cataract emerged as the most frequently implicated and potentially reversible cause of visual impairment associated with fall-related injuries. Reduced visual acuity, impaired contrast sensitivity, and visual field defects were the principal visual parameters associated with an elevated risk of falls. Furthermore, evidence suggests that timely identification and treatment of remediable visual disorders, particularly cataract, may contribute to reducing fall-related morbidity and subsequent hip fractures in the elderly population.

Our findings are supported by the study of De Boer et al who evaluated 1,418 geriatric patients from both institutionalized and community-dwelling settings and reported that reduced contrast sensitivity was more strongly associated with recurrent falls than subjective visual impairment alone.⁷ Similarly, several retrospective studies involving approximately 4,000 community-dwelling older adults demonstrated that reduced visual acuity, impaired contrast sensitivity, and visual field loss

significantly increased the risk of falls.⁸⁻¹¹ Among the various ocular pathologies examined, posterior subcapsular cataract was associated with a particularly high fall risk.

The strong association between cataract and fall-related injuries observed in our review is further supported by Sang et al., who analyzed more than three million individuals and reported an approximately threefold increase in the risk of falls and fractures among older adults with cataract.¹² In the same study, glaucoma and age-related macular degeneration (AMD) were associated with nearly a twofold increase in risk. These findings highlight the importance of age-related eye diseases as potentially modifiable contributors to falls and fractures.

Several studies included in this review emphasize the high prevalence of unrecognized and untreated visual impairment among elderly patients presenting with hip fractures. Aishah et al demonstrated the effectiveness of an orthoptic-led bedside vision screening service among 3,321 patients admitted with fragility hip fractures, identifying a substantial proportion of previously undiagnosed visual impairment, with cataract being the most common condition requiring referral.¹³ Likewise, a four-center study of 537 patients admitted with fracture neck of femur found bilateral visual impairment in nearly half of the cohort, most commonly due to untreated cataract, despite the majority having potentially correctable visual deficits.¹⁵

Our review also suggests that cataract surgery may play an important role in fall prevention. Afflitto et al in a meta-analysis involving 4.7 million participants, reported an increased fracture risk among individuals with cataract and observed the lowest fracture risk among pseudophakic patients.¹⁴ Although Desapriya et al found no significant reduction in recurrent falls following cataract surgery, a more recent meta-analysis by Gutiérrez-Robledo et al demonstrated that first-eye cataract surgery reduced recurrent falls by approximately one-third.^{17,18} In addition to fall prevention, cataract surgery has been associated with a reduced risk of long-term cognitive decline and favorable cost-effectiveness outcomes, further supporting early intervention for visually significant cataracts.^{19,20}

Beyond cataract, AMD and glaucoma were also identified as important contributors to fall risk. Wood et al reported a 44% incidence of falls among community-dwelling individuals with AMD, with reduced contrast sensitivity being the strongest predictor of fall-related injuries.²¹ Similarly, studies evaluating glaucoma demonstrated a significant relationship between progressive visual field loss and a history of falls.^{22,23} These findings suggest that functional visual deficits, particularly impaired contrast sensitivity and visual field loss, may be more important predictors of falls than visual acuity alone (Table 2).

Taken together, the evidence indicates that visual impairment is a significant and potentially modifiable risk

factor for falls and hip fractures in older adults. Routine ophthalmologic assessment, early detection of visual dysfunction, correction of refractive errors, and timely management of cataract and other treatable ocular conditions should be considered integral components of comprehensive fall-prevention strategies in the geriatric

population. Hence, visual field loss (a functional deficit) predicts fracture risk, clinicians should consider field testing and mobility counselling for patients with field-loss disorders, although direct evidence that glaucoma severity per se independently raises fracture risk is insufficient (Table 3).

Table 2: Summary of studies evaluating visual impairment, falls, and hip fracture risk in older adults

Author (Ref)	Study population	Visual impairment evaluated	Key findings
De Boer et al⁷	1,418 geriatric patients (institutionalized and community dwelling)	Contrast sensitivity, subjective poor vision	Reduced contrast sensitivity was more strongly associated with recurrent falls than self-reported poor vision.
Multiple retrospective studies⁸⁻¹¹	~4,000 community-dwelling older adults	Visual acuity, contrast sensitivity, visual field loss	Reduced visual acuity, impaired contrast sensitivity, and visual field defects significantly increased fall risk. Posterior subcapsular cataract carried the highest risk among ocular diseases studied.
Sang et al¹²	>3 million individuals	Cataract, glaucoma, AMD	Cataract was associated with a threefold increase in falls and fractures; glaucoma and AMD with approximately twofold increased risk.
Aishah et al¹³	3,321 patients admitted with fragility hip fractures	Vision screening for ocular disorders	Orthoptic-led screening identified substantial previously undiagnosed visual impairment; cataract was the most common condition requiring referral.
Gallo Afflitto et al¹⁴	Meta-analysis; 4.7 million participants and 2.8 million fractures	Cataract status and pseudophakia	Cataract was associated with increased fracture risk; pseudophakic patients demonstrated the lowest fracture risk.
Four-centre study¹⁵	537 patients ≥ 65 years with neck of femur fracture	Bilateral visual impairment	46% had bilateral visual impairment; untreated cataract was the leading cause. Most visual deficits were potentially treatable.
10-year follow-up study¹⁶	Older adults followed longitudinally	General visual impairment	Reduced vision independently increased risk of fall-related accidents, although greater severity of impairment did not further increase risk.
Desapriya et al¹⁷	Systematic review of 2 RCTs	Cataract surgery	No significant evidence that cataract surgery reduced recurrent falls.
Gutiérrez-Robledo et al¹⁸	Meta-analysis (1,014 preoperative and 817 postoperative patients)	Cataract surgery	First-eye cataract surgery reduced recurrent falls by approximately one-third.
Cognitive outcomes review¹⁹	24 studies	Cataract surgery	Cataract surgery was associated with a 25% reduction in long-term cognitive decline.
Matt et al²⁰	Economic evaluation	Early cataract surgery	Early surgery was cost-effective and improved quality-adjusted life years while reducing fall-related morbidity.
Wood et al²¹	Community-dwelling AMD patients	AMD, contrast sensitivity, visual acuity	Falls occurred in 44% of patients; reduced contrast sensitivity was the strongest predictor of fall-related injury.
Glaucoma studies^{22,23}	Older adults with glaucoma	Visual field loss	Progressive visual field deterioration was associated with falls; approximately 25% reported at least one fall annually.

Table 3: Observed association with falls or hip fracture.

Conditions	Observed association	Recommendation
Untreated cataract	Common cause of vision deficits among hip fracture patients	Cataracts were the most frequent remediable cause of deficit, but associations may be mediated by acuity
Posterior subcapsular cataract	Strongly associated with higher hip fracture risk	Suggests certain cataract subtypes elevate short-term fracture risk beyond general cataract prevalence
Glaucoma	Moderate prevalence among causes in hip fracture patients and no clear independent effect demonstrated in older cohort data	Direct evidence that glaucoma severity independently increases hip fracture risk is limited or inconsistent; visual field loss (which can occur with glaucoma) is a clearer functional predictor
Visual field loss (e.g., AMD)	Associated with increased hip fracture risk	Field loss impairs obstacle detection and mobility; may be caused by several diseases including AMD

DISCUSSION

When writing a review article, SciSpace and Google Search differ significantly in purpose, functionality, and academic utility. Google Search is a broad, general-purpose search engine designed to index and retrieve information from across the entire internet, including websites, blogs, news portals, commercial pages, institutional reports, and occasionally academic PDFs. While it is highly useful for preliminary exploration of a topic, identifying keywords, locating guidelines, accessing government or organizational reports, and understanding broader contextual issues, it does not provide built-in academic analysis, critical appraisal tools, or structured summarization of research papers. The responsibility for evaluating source credibility, determining methodological quality, and extracting relevant data rests entirely with the researcher. In contrast, SciSpace is an AI-driven scholarly research platform specifically developed to assist researchers in navigating scientific literature efficiently. It primarily provides access to peer-reviewed journal articles from major academic publishers such as Elsevier, Springer, and Wiley, ensuring a higher likelihood of retrieving credible and research-focused content. Beyond simple search capabilities, SciSpace allows users to upload and interact with PDFs, obtain AI-generated explanations of complex paragraphs, extract key findings, summarize methodologies and results, compare studies, and generate citations in standard academic formats. These features streamline the literature review process, reduce time spent interpreting dense scientific language, and facilitate structured synthesis of evidence, which is particularly valuable when preparing systematic reviews, meta-analyses, or narrative reviews in medical and scientific fields. Consequently, although Google Search is valuable for background research and supplementary information gathering, SciSpace offers deeper academic support, greater efficiency in handling peer-reviewed literature, and enhanced assistance in synthesizing evidence, making it a more specialized and powerful tool for high-quality review writing.

For a topic like visual impairment and hip fracture risk, SciSpace helps you gather and synthesize evidence from

multiple clinical studies, compare methodologies, and locate relevant citations from published orthopedic, ophthalmology, and geriatric research. Its output is rooted in real, citable academic sources, making it ideal for literature reviews, meta-analyses, and formal scientific writing. ChatGPT, on the other hand, is a general-purpose AI language model that generates text based on patterns in the data it was trained on. When you ask ChatGPT about the association between age-related eye problems and hip fractures, it can provide a summary, explanation, background context, and conceptual connections using general medical knowledge and logic—but it doesn't search real-time literature or access new research outside its training data. ChatGPT can help you draft sections of your review, refine hypotheses, explain mechanisms (e.g., how cataract-related vision loss increases fall risk), organize outlines, or clarify terminology, but it cannot directly retrieve or cite specific peer-reviewed articles unless they are part of its training. So, SciSpace is a literature discovery and evidence extraction tool, while ChatGPT is for writing and interpretation assistant.

This systematic review pooled data from 26 studies to evaluate the need for proactive ophthalmic consultation in elderly patients admitted with hip fractures. Visual assessment in older adults is essential to minimize fall-related complications and associated morbidity. Visual acuity plays a crucial role in the overall well-being and functional independence of the elderly. Falls are multifactorial in origin, resulting from a combination of intrinsic and extrinsic factors. However, the risk of unintentional injury is significantly higher in visually impaired individuals compared to those with fully corrected vision. Our analysis suggests that individuals with cataract have a higher risk of falls and fractures compared to those without cataract, followed by AMD and glaucoma. This indicates a greater long-term comorbidity burden among individuals with age-related ocular diseases. In this review, most patients were diagnosed through cross-consultation or referral to ophthalmology, despite being admitted under orthopaedic care for hip fractures. Cataract not only increases the overall probability of fracture occurrence but is also associated with earlier fracture events. These findings suggest that the

clinical significance of diagnosing and treating age-related eye diseases in patients admitted for hip fractures extends far beyond improving visual function alone. Proactive ophthalmic evaluation may contribute to fall prevention strategies and potentially reduce future fracture risk, thereby improving overall patient outcomes.

Some studies have broadly categorized population, based on their level of care into those living in sheltered/ old-age homes and community dwellers. Sheltered homes population have access to regular assistance and timely medical check-up reducing the incidence of unintentional falls and injuries. When no such difference is being considered in selecting the subjects it is termed as unselected population. This unselected population group provides the most precise material for epidemiological studies and has been taken into consideration while selecting the studies. As, differentiation in selectivity of the population, pose a selection bias in the interpretation of results. Also, majority of the reports published on association between visual impairment and hip fractures are prospective in nature with few cross-sectional designs. However, only the retrospective study designs were taken into review as they accurately emphasize the importance of visual assessment in patients admitted for hip injuries. Because this study used a retrospective design, it is challenging to determine whether certain identified risk factors, such as poor functional ability, are causes or consequences of previous falls. However, this limitation is less significant when considering impaired vision as a potential risk factor, since falls rarely lead to visual impairment.

Other variables previously identified as being associated with the risk of recurrent falls were adjusted for in several studies. Findings from studies that did not account for these potential confounding factors are less robust and should be interpreted with caution compared to those that employed multivariate analyses to control for such variables.

About half of the unintentional falls in elderly results in injuries, with one-tenth being serious issues. Approximately 1% of all falls among older adults lead to hip fractures, a serious consequence that substantially increases the risk of post-fall morbidity and mortality.²⁴ However, fewer than half of older adults who experience a fall seek medical advice. Recurrent falls not only increase the risk of injury and hospitalization but can also have catastrophic consequences for older individuals. After age 50 years, the lifetime risk for hip fractures ranges from 6 to 17%. Approximately 75% of all vertebral and non-vertebral fractures occur in individuals aged 65 years and above, and more than 75% of hip fractures are seen in adults aged 75 years or older. After sustaining a hip fracture, nearly 27% of elderly individuals die within one year. Furthermore, among seniors who experience a proximal femur fracture, approximately 50% demonstrate significant functional decline during the first year following the injury.

Quality of life often declines markedly after a fall. Many older adults who were independently mobile prior to sustaining a fall-related hip fracture fail to regain their previous level of mobility. Additionally, the experience of falling can instil a persistent fear of recurrent falls, particularly among those with a prior history of falling. This fear may reduce self-confidence and lead to activity restriction, with individuals avoiding essential daily tasks such as shopping or household chores. Over time, decreased physical activity contributes to muscle weakness and joint stiffness, further limiting mobility and increasing the risk of subsequent falls. Therefore, maintaining mobility and implementing effective fall-prevention strategies are crucial to preserving independence and reducing fall-related injuries in the elderly population. Fractures are considered an independent predictor of long-term mortality, meaning that the increased risk of death persists even after adjusting for confounding factors such as age, sex, comorbidities, and baseline functional status. Numerous longitudinal studies have shown that older adults who sustain major fractures-particularly hip and vertebral fractures-have significantly higher mortality rates compared to age-matched controls without fractures. This association remains significant in multivariate analyses, suggesting that fractures themselves contribute to adverse outcomes through mechanisms such as immobility, thromboembolic events, infections, deconditioning, and loss of independence. Therefore, fractures in the elderly should not be viewed merely as isolated skeletal injuries but as serious health events with substantial long-term prognostic implications.

Studies included here varied considerably in terms of methods used to assess visual acuity and other specific visual parameters, making direct comparison of findings and overall interpretation challenging. Among these retrospective studies, 7 employed objective measurement techniques, while 5 relied solely on subjective reports of poor vision or self-reported diagnoses of eye disease. Self-reported diagnoses of eye disease are generally less reliable as indicators of true visual status. Furthermore, the assessment of visual acuity was not standardized across studies. Most studies measured binocular visual acuity, which is more clinically relevant than monocular acuity. Objective measurements are typically conducted under standardized conditions, such as controlled lighting, which may not accurately reflect real-world visual demands. In contrast, subjective assessments capture individual's experiences in their usual living environments and can therefore provide meaningful insights. However, subjective questions may be interpreted differently by participants, potentially introducing variability and bias into the results. In most studies, vision of patients was recorded using Snellen chart. Distance visual acuity was assessed for both eyes together as well as individually for each eye, with and without spectacle correction. In addition, visual field analysis was performed for each eye, and confrontation testing was conducted to detect the presence of visual impairment. However, visual acuity was

worse than 6/24 in some patients, and a proportion of them were also found to have significant bilateral visual field loss.²⁵

Squirrell et al reported that 58% of their cohort had impaired visual acuity of 6/18 or worse in at least one eye, with the predominant causes being Cataract, uncorrected refractive error, and AMD.²⁶ Similarly, Cox et al in a larger study, found that 46% of participants had impaired vision based on binocular visual acuity of 6/18 or worse.¹⁵ However, reliance on binocular acuity may have underestimated the true prevalence of visual impairment. In their study, visual impairment was primarily attributed to cataracts, followed by AMD and uncorrected refractive error. Two retrospective studies conducted among community-dwelling populations, with adjustments made for multiple confounding variables, demonstrated that poor visual acuity was significantly associated with an increased risk of recurrent falls.^{9,10} In one of these studies, additional visual impairments-including reduced contrast sensitivity, visual field loss, and posterior subcapsular cataract-were also identified as independent risk factors for recurrent falls.

In this review, we observed an increased risk of both falls and fractures among individuals with cataract, AMD, or glaucoma. This association remained significant even after adjusting for a higher burden of comorbidities in those with eye disease, including multiple chronic conditions and greater medication use. Site-specific analyses demonstrated an increased risk of fractures at nearly all anatomical locations, with particularly elevated risks observed for lower leg fractures. These findings further strengthen the existing evidence that cataract, AMD, and glaucoma are significant risk factors for both falls and fractures. Our findings contrast with earlier studies that reported only certain eye diseases as significant predictors of falls. However, those studies relied on self-reported fall outcomes, which may have been subject to recall bias and, therefore, could have underestimated or misclassified the true association between eye disease and fall risk.⁸ Ocular motility abnormalities may increase the risk of falls and hip fractures.¹¹ These abnormalities may impair postural stability by reducing depth perception, thereby increasing susceptibility to missteps, imbalance, and subsequent fractures, particularly of the hip.

The eye evaluation should reliably quantify visual acuity, enabling clinicians to identify patients who require timely referral to an ophthalmology department for potential surgical or medical intervention. At the same time, it helps distinguish individuals whose visual impairment may be adequately managed with updated refractive correction from a local optician. Importantly, beyond measuring visual acuity alone, the assessment also evaluates other vision-related risk factors associated with falls and fragility hip fractures, including visual field deficits and binocular vision abnormalities. By detecting these additional impairments, the screening tool supports early intervention strategies aimed at reducing fall risk and

improving functional outcomes in older adults. Screening should be able to rule out stereopsis and contrast sensitivity, two visual factors recently found associated with risk of fall.²⁷

Cataract surgery reduces fracture risk by delaying the time to first fracture episode, likely due to sudden improvement in subjective and objective vision. First-eye cataract surgery reduces the incidence of future fall by 30%.¹⁴ Cataract surgery has been shown to improve contrast sensitivity, colour perception, and stereopsis that is important for an individual's ability to safely navigate their surroundings. Benefits of cataract surgery extends beyond improving vision, encompassing overall wellbeing, physical performance and mood. Also, studies have linked cataract surgery to an increased risk of fall during the post-op period. This is due to anisometropia (i.e., un-equal refractive power between eyes) as a key factor for risk. Hence, recommendation for expedited second-eye cataract surgery in individuals with bilateral cataract.

Limitations

Our analysis included both community-dwelling individuals and those residing in institutional settings, which may introduce inherent variations and potential confounding factors. The inclusion of these heterogeneous groups may therefore affect the comparability of results and should be considered when interpreting the overall findings. Additionally, the potential influence of overlapping systemic conditions on fracture risk-such as osteoporosis and various forms of dementia-was not specifically addressed. These conditions are independently associated with an increased risk of falls and fractures and may also interact with visual impairment, further compounding vulnerability.

This review includes retrospective studies based on self-report to identify either the outcome or the risk factors. However, self-reporting of eye and bone diseases and surgical history often significantly underestimates the true disease burden. Incomplete or inconsistently documented records often made it challenging to determine whether the cataract was unilateral or bilateral, or which eye had undergone surgical intervention.

This lack of detailed laterality data may limit the precision of analyses exploring the association between cataract, surgical correction, and outcomes such as falls or hip fractures, as visual impairment severity and binocular function can differ substantially depending on whether one or both eyes are affected. Without a uniform grading scale, it becomes challenging to determine the true extent of visual impairment attributable to cataract and to assess dose-response relationships between cataract severity, visual dysfunction, and outcomes such as falls or fragility hip fractures. This heterogeneity may therefore reduce the reliability and generalizability of pooled findings in the literature.

CONCLUSION

Elderly's sustaining a fragility hip fracture have impaired vision, much of which is easily treatable and can be detected effectively with pro-active eye consultation. The evidence about cataract, AMD and Glaucoma, as risk factors for fall and fractures is very high in this AI based review. Population would likely benefit from improve cross consultations, referrals to ophthalmology services and targeted interventions to prevent related adverse outcomes. Engagement with eye care services remains suboptimal within this older population. The underlying barriers-whether related to accessibility, awareness, mobility limitations, cognitive impairment, socioeconomic factors, require further exploration. Addressing these factors is essential to improve service uptake, facilitate early detection of treatable visual impairment, and ultimately reduce the risk of adverse outcomes such as falls and hip fractures.

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