

Pain and falls mini-review

Dr Esther Vance and Professor Stephen R. Lord, Neuroscience Research Australia

Introduction

Falls are the leading cause of unintentional injury in Australia in people aged 65 years and over (1). In 2016-17 there were 40,889 injury hospitalisations due to falls in NSW for those aged 65 years and over and for the reporting period January – June 2017, the number of inpatient falls for this age group was 13,192 with 27% resulting in injury. A number of factors increase an older person's risk of falls and these include both intrinsic and extrinsic factors. An important risk factor that is often not addressed is pain (2). Pain is not usually included in routine fall risk screens and assessments and often not well addressed across care settings. This mini-review will examine a) the nature and problem of pain for older people, b) the relationship between pain and falls, c) the assessment of pain, d) the effect of pain medication on fall risk, and d) interventions that have targeted pain in older people.

Pain and older people

Pain has been identified as an issue for older people living in the community and in residential aged care facilities with the prevalence of current pain ranging from 20 – 46 % in the community and 28-73% for those in Residential Aged Care facilities (RACF). Corresponding figures for chronic pain are 25-76% for the community and 83-93% for those in RACFs (3). The majority of studies have found that women have a higher prevalence of pain than men. The most common sites reported for pain are the back, leg/knee, hip, other joints and feet (4, 5). Pain can impact on an older person's quality of life as well as their ability to function independently (6).

Pain is often undertreated in older people (7). In a large sample of nursing home residents, almost 50% experienced chronic pain, but 25% were not given pain medications and less than 50% had ongoing pain medications prescribed despite guideline recommendations (11). In a hospital study of hip fracture patients, 50% reported moderate to severe pain, yet ongoing pain management was not provided for over 80% (8). In an Emergency department setting, 34% of older people were not assessed for pain and 40% of those whose pain was rated as 7/10 were not prescribed analgesics (11). Untreated pain has a number of consequences for older people including poor sleep, malnutrition, physical function deterioration, depression, anxiety and impaired cognition as well as falls which can all lead to reduced quality of life (8).

Pain and falls in community studies

The mechanisms for the association of pain with falls are complex and may include the neuromuscular effects of pain, local joint pathology and interference with cognitive and executive functions (9).

Two systematic reviews by Stubbs and colleagues have investigated the contribution of pain to falls and recurrent falls (9, 10). The first systematic review and meta-analysis included 21 studies of falls in the community and found that in those reporting pain, 50.5% had one or more falls over 12

months compared to 25.7% in a comparison group with no pain ($p < 0.001$). The primary meta-analysis of 14 studies demonstrated that pain was associated with an increased odds of falling (OR = 1.56 (95% CI 1.36-1.79, $n = 17,926$.) Further, a sub-group analysis that included only prospective falls (the preferred measure of falls ascertainment) also found that the odds of falling was significantly higher in those with pain (OR 1.71; 95% CI 1.56 – 2.09, $n = 4674$). Foot pain was strongly associated with falls (OR = 2.38; 95% CI 1.62-3.48, $n = 691$) as was chronic pain (OR 1.80 95% CI 1.56-2.09, $n = 5367$) (9).

The second systematic review investigated whether pain was associated with recurrent falls (10). This review included 11 studies and found a prevalence of recurrent falls of 12.9% in participants who reported pain compared to 7.2% of those without pain ($p < .001$). A meta-analysis found that pain was associated with recurrent falls (OR 2.04; 95% CI 1.75-2.39, $n = 3,950$ with pain and $n = 5631$ without pain). A subgroup analysis using only prospective data also demonstrated a significant association (OR = 1.79, 95% CI 1.44-2.21, $n = 2,646$).

A recent study by Crowe and colleagues of over 45,000 community-living older adults (mean age = 82.5 years) seeking health service support found that almost half reported daily pain, and one third of the sample reported that pain control was inadequate (6). The presence of severe pain was associated with a high frequency of falls and depression, after adjustment for age, ethnicity and gender.

A United States National Health and Aging Trends Study found that 53% of participants reported pain. In those with pain, the prevalence of recurrent falls was 19.5%; considerably higher than for those without pain (7.5%). The study authors concluded that pain can impact muscle strength, balance and gait speed and lead to activity avoidance due to fear of falling (11). The association between pain and falling remained significant even when people with co-morbid conditions such as arthritis and depressive symptoms were excluded from analysis (11).

Assessment of pain

Self-report (even for those with cognitive impairment) is the most accurate and reliable measure of pain. This can be supplemented with questions such as *'What is stopping you from doing what you want to do?'* (12). Validated tools for the assessment of pain include the Multidimensional Pain Inventory, the Faces Pain Scale and the Visual Analogue Scale (7, 13). Functional assessments such as the Pain Disability Index is also informative and WHODAS 2.0 can help document the presence and severity of pain. (7). In people with dementia, pain assessment tools such as the Abbey Pain Scale or PAINAID can be used; these can be obtained from the ACI Pain Management Network (see Resources section).

A multidisciplinary approach to pain assessment and management is important. Guidelines have been prepared on the assessment and management of pain by the British Pain Society and British Geriatrics Society (4). Pain should be assessed on a regular basis and fluctuations noted. Assessment of pain before and after administration of pain management is also important (13). Functional status, emotional functioning and situational and contextual factors also need to be assessed. Pain assessment during movement may also be required (13). A strong association has also been found

between pain and depression, social isolation and loneliness, so these factors also need to be considered (4).

Pain medications

Older people with pain are often treated with medications such as analgesics, opioids and anti-inflammatory medications and these drugs can also increase the risk of falls. Older people with pain who also suffer from depression may be treated with antidepressants and their use also increases fall risk in older people (14). The evidence for opioids increase in fall risk is not as clear-cut, however a recent systematic review and meta-analysis found opioids did significantly increase fall risk, and that this may be due to the side effects of these medications that include sedation, dizziness and cognitive impairment; all known risk factors for falls (15). The use of pain medications and antidepressants needs to be balanced against the effects of under-treatment of pain and depression on the one hand and the possible side effects of the medications on the other.

Interventions

One randomized trial with a 25 week program of resistance and agility training in older women showed improvement in back pain as well as quality of life indicators (16). Another RCT in 141 people aged over 65 years with chronic pain has contrasted an outpatient pain self-management program that included cognitive behavioural therapy (CBT) and exercise with a program comprising exercise and a discussion session as well as a waiting list (usual care). This study found the CBT based exercise group was more effective in reducing disability and chronic pain than both the exercise and discussion intervention or usual care (17).

Exercise (specifically balance and strength exercises), however, has the strongest evidence for preventing falls in the community living older people; i.e. systematic review evidence from 88 trials showing exercise reduces falls by 21% (18). There is evidence exercise can reduce pain (19, 20), and even though pain outcomes have not usually been included in these studies, exercise should still be considered an appropriate fall prevention strategy for older people with pain in the community.

Finally, the treatment of pain has been included in some multifactorial fall prevention trials in older people. For example, pain management was included in a multifaceted podiatry intervention delivered by podiatrists to older people with foot pain and this reduced the rate of falls by 36% (IRR 0.64, 95% CI 0.45 - 0.91, $p=0.01$) (21).

Pain Management Resources

A range of resources is available for pain management including the British Geriatrics Society guidelines for older people (6). Pain Australia - a non-profit organisation - has a range of resources for both health professionals and consumers including; fact sheets, reports, books and education and training for health professionals. The Agency for Clinical Innovation Pain Management Network has a range of assessment tools and practice guidelines and resources for the management of chronic pain and flyers and videos for clinicians and consumers (see website links in resources information).

Summary

Pain is an important risk factor for falls in older people in community, hospital and residential aged care settings. Pain should be regularly assessed for older people at risk of falls, with pain management strategies instituted that adequately address pain yet not increase fall risk. Exercise is likely to be a key component of fall prevention strategies for older people living in the community with pain and the addition of CBT may assist those with chronic pain.

Resources for health professionals and consumers available from:

ACI Pain Management Network <https://www.aci.health.nsw.gov.au/chronic-pain>

British Geriatrics Society <https://www.bgs.org.uk/policy-and-media/new-guidelines-for-recognising-and-assessing-pain-in-older-adults>

PainAustralia <http://www.painaustralia.org.au/health-professionals/resources/fact-sheet>

References

1. AIHW, Kreisfeld R, Pointer SC, Bradley CE. Trends in hospitalisations due to falls by older people, Australia 2002-3 to 2012-13. Injury Research and Statistics Series. 2017;106(Cat. no INJCAT 182).
2. Leveille S, Jones R, Kiely D, et al. Chronic musculoskeletal pain and the occurrence of falls in the older population. JAMA. 2009;302:2214-21.
3. Abdulla A, Adams N, Bone M, et al. Guidance on the management of pain in older people. Age Ageing. 2013;42:i 1-57.
4. Schofield P. The Assessment of Pain in Older people: UK National Guidelines. Age Ageing. 2018;47:i 1-22.
5. Mickle KJ, Munro BJ, Lord SR, Menz HB, Steele JR. Foot Pain, Plantar Pressures, and Falls in Older People: A Prospective Study. Journal of the American Geriatrics Society. no-no.
6. Crowe M, Jordan J, Gillon D, McCall C, Frampton C, Jamieson H. The prevalence of pain and its relationship to falls, fatigue, and depression in a cohort of older people living in the community. Journal of Advanced Nursing. 2017;73(11):2642-51.
7. Schofield P, Abdulla A. Pain assessment in the older population: what the literature says. Age and Ageing. 2018;47(3):324-7.
8. Herr K. Pain in the older adult: an imperative across all health settings. Pain Management Nursing. 2010;11(2):S1-S10.
9. Stubbs B, Binnekade T, Eggermont L, Sepehry AA, Patchay S, Schofield P. Pain and the Risk for Falls in Community-Dwelling Older Adults: Systematic Review and Meta-Analysis. Archives of Physical Medicine and Rehabilitation. 2014;95(1):175-87.e9.
10. Brendon S, Pat S, Tarik B, Sandhi P, Amir S, Laura E. Pain Is Associated with Recurrent Falls in Community-Dwelling Older Adults: Evidence from a Systematic Review and Meta-Analysis. Pain Medicine. 2014;15(7):1115-28.
11. Patel K, Phelan E, Leveille S, Lamb S, Missikpode C, Wallace R, et al. High prevalence of falls, fear of falling, and impaired balance in older adults with pain in the United States: Findings from the 2011 national Health and Aging Trends Study. JAGS. 2014;62:1844-52.
12. Pautex S, Michon A, Guedira M, Emond H, Lous PL, Samaras D, et al. Pain in Severe Dementia: Self-Assessment or Observational Scales? Journal of the American Geriatrics Society. 2006;54(7):1040-5.

13. Hadjistavropoulos T, Herr K, Prkachin KM, Craig KD, Gibson SJ, Lukas A, et al. Pain assessment in elderly adults with dementia. *The Lancet Neurology*. 2014;13(12):1216-27.
14. Woolcott JC, Richardson KJ, Wiens MO, Patel B, Marin J, Khan KM, et al. Meta-analysis of the Impact of 9 Medication Classes on Falls in Elderly Persons. *Arch Intern Med*. 2009;169(21):1952-60.
15. Seppala LJ, van de Glind EMM, Daams JG, Ploegmakers KJ, de Vries M, Wermelink AMAT, et al. Fall-risk-increasing drugs: a systematic review and meta-analysis: III. Others. *Journal of the American Medical Directors Association*. 2018;ePub(ePub):ePub-ePub.
16. Liu-Ambrose TYL, Khan KM, Eng JJ, Lord SR, Lentle B, McKay HA. Both resistance and agility training reduce back pain and improve health-related quality of life in older women with low bone mass. *Osteoporosis International*. 2005;16:1321-9.
17. Nicholas MK, Asghari A, Blyth FM, Wood BM, Murray R, McCabe R, et al. Self-management intervention for chronic pain in older adults: A randomised controlled trial. 2013;154(6):824-35.
18. Sherrington C, Michaleff ZA, Fairhall N, Paul SS, Tiedemann A, Whitney J, et al. Exercise to prevent falls in older adults: an updated systematic review and meta-analysis. *British journal of sports medicine*. 2016;ePub(ePub):ePub-ePub.
19. Bertozzi L, Gardenghi I, Turoni F, Villafañe JH, Capra F, Guccione AA, et al. Effect of Therapeutic Exercise on Pain and Disability in the Management of Chronic Nonspecific Neck Pain: Systematic Review and Meta-Analysis of Randomized Trials. *Physical Therapy*. 2013;93(8):1026-36.
20. Fransen M, McConnell S, Harmer AR, Van der Esch M, Simic M, Bennell KL. Exercise for osteoarthritis of the knee. *Cochrane Database of Systematic Reviews*. 2015(1).
21. Spink MJ, Menz HB, Fotoohabadi MR, Wee E, Landorf KB, Hill KD, et al. Effectiveness of a multifaceted podiatry intervention to prevent falls in community dwelling older people with disabling foot pain: randomised controlled trial. *BMJ*. 2011;342.