Cost effectiveness of falls prevention programmes for older adults

Commentary on: Winser SJ, Chan HTF, Ho L, Chung LS, Ching LT, Felix TKL, Kannan P. Dosage for cost-effective exercise-based falls prevention programs for older people : A systematic review of economic evaluations. Ann Phys Rehabil Med. 2020 Jan;63(1):69-80. doi: 10.1016/j.rehab.2019.06.012. Epub 2019 Jul 12. PMID: 31306811.

Key Points

1) There is no clear-cut message as to which exercise-based falls prevention programme intervention is most cost-effective in preventing falls in older people.
2) The overall cost-effectiveness of exercise-based falls prevention programmes is unclear.
3) Wherever possible, exercise-based falls prevention programmes should be undertaken on the basis of robust cost-effectiveness analyses/clinical audits.

Introduction

The worldwide prevalence of falls is 5,186 per 100,000 people (James et al 2020) and is one of the leading causes of injury for older adults (Berková and Berka 2018). Falls are associated with a substantial increase in risk of mortality (McMahon 2012) and are the second leading cause of unintentional death worldwide (WHO 2021). A single fall can lead to reduced social participation (Pin and Spini 2016), functional capacity (Laybourne et al 2008) and self-confidence (Schoeneet al 2019). These broad impacts can lead to disability and long-term stays in nursing home (Christine et al 2012).

As well as the individual impact, falls in older adults represent a substantial burden to the National Health Service (NHS). Between April 2020 and March 2021, the rate of fall-related emergency admissions in England for adults over 65 was 2,023 per 100,000 population (Public Health England 2021). Falls trigger the use of over 4 million bed days in England alone and cost around 2.3 billion each year (Treml, et al. 2011; NICE 2013). Due to this substantial individual burden and subsequent financial ramifications, there is a need to identify interventions that are not just effective but also cost-effective. This need forms part of a wider healthcare resource allocation decision-making process which balances healthcare systems' limited resources, individual and collective health-related priorities, and the importance of cost-effectiveness evidence in facilitating the intervention's future roll out. Previous reviews in this area have identified that exercise falls preventions programs for older people are effective in reducing rates of falls (Palmer et al 2020). A systematic review by Winser et al. (2020) examines the cost-effectiveness of exercise-based programmes for falls prevention in older people. This review adds to the existing evidence base (Olij et al. 2018; Davis et al. 2010) and contributes to informing resource allocation decisions in budget-constrained healthcare systems.

Aim of commentary

This commentary aims to critically appraise the methods used within the review by Winser et al. (2020) and expand upon the findings in the context of clinical practice.

Methods

The Methods and Results described in this and in the next section represent a summary of those presented in the original article (Winser et al. 2020). A robust multi-database search was carried out from inception to February 2019. Additional screening of reference lists of all included studies was undertaken. Randomised controlled trials (RCTs) which examined the cost-effectiveness of exercise-based prevention programmes to prevent falls in older adults (≥60 years old) were included. Studies which were not published in English, conference abstracts only or study protocol were excluded. Title and abstract screening were undertaken by a single reviewer. Full paper screening, data extraction and assessment of bias (Physiotherapy Evidence Database [PEDro scale] & Quality of Health Economic Studies [QHES] scale) were undertaken by two reviewers with arbitration by a third reviewer. The main outcomes of focus were the cost per quality-adjusted life year (QALY), incremental cost-effectiveness ratio (ICER), the benefit-to-cost ratio, and the incremental cost per fall prevented.

Results

After duplicate removal, 1033 studies were screened from which 12 RCTs were included. Using the PEDro scale, five RCTs were judged to be of good quality and seven RCTs were judged to be of poor quality. Of the 12 included studies, eight had a high-quality economic evaluation as assessed using the QHES scale (Ofman 2003). However, of the four studies which reported the interventions to be cost-effective, three had a poor methodological quality and one had both poor methodological and economic evaluation quality.

Studies were separated into two groups of exercise only (seven RCTs) and multifactorial interventions (five RCTs). The multi-faceted interventions included exercise plus risk management, occupational therapy, and environmental modifications. The included studies adopted either a healthcare system (n=7) or a societal perspective (n=5). Cost-utility (CUA) (Robinson et al. 1993) and cost-effectiveness analyses (CEA) (Rutigliano et al. 1995) were the most common analytical frameworks (used by 10 studies). The most common primary outcome measures were the QALY in CUAs (n=4) and the number of falls during follow-up in CEAs (n=8). Four studies used the ICER to report the results. Only two studies had a time horizon longer than 12 months.

While seven studies reported the interventions to be cost-effective (n=4) or potentially cost-effective (n=3), the remaining 5 studies reported the interventions to be not cost-effective. Among the cost-effective or potentially cost-effective interventions, four were based on exercise-only and three were multifactorial. Based on the seven exercise only and multi-faceted studies classified to be cost-effective, a range of specific possible moderating factors were identified: these were exercise duration of 30 to 60 minutes, with frequency of once or twice weekly and minimal intervention lasting six months.

All the costs were converted by the authors into US Dollars (USD) 2018. For cost-effective exercise-only interventions, the cost of implementation ranged from 64.4 USD (McLean & Dalton 2015) to 533.5 USD (Robertson et al. 2001) per person. For cost-effective multifactorial interventions, the cost of implementation was estimated as 905 USD per person in one study (Rizzo et al. 1996). The incremental cost per fall prevented was estimated as 840 USD for an exercise-only intervention in one study (McLean & Dalton 2015) and 8,824 USD for a multifactorial intervention in another study (Rizzo et al. 1996).

Commentary

Using a modified version of the Joanna Briggs Institute Critical Appraisal tool for systematic reviews, this review scored 7 out of 9 criteria (Aromataris et al. 2015). The two criteria which were not achieved were issues regarding methods of synthesis and assessment/addressing of publication bias. Additionally, only one reviewer undertook screening of title and abstract which may lead to relevant studies being excluded from the review. Furthermore, in the presentation of the results on moderating factors, there was incorrect referencing where studies deemed to be non-cost-effective were identified to be cost-effective (e.g. Iliffe et al. 2014). This review is of moderate quality and may provide a comprehensive summary of the results of the available studies that address the question of interest.

Caution needs to be applied when interpreting the cost-effectiveness findings, as issues have emerged. First, as the authors recognised (Winser et al. 2020), the included studies differ in terms of the perspective adopted (societal vs healthcare system), geographical contexts (e.g. North America vs Europe), comparators assessed (e.g. exercise-only vs multifactorial interventions), type of costs included (e.g. direct vs indirect costs), outcomes analysed (e.g. QALY vs falls averted) and methodological choices (e.g. CUAs vs CEAs and whether discounting was applied or not). This clinical and methodological heterogeneity is not appropriately examined in the review. For example, minimal clinically important differences for specific outcomes (how many averted falls are clinically significant?) and clear-cut cost-effectiveness thresholds (what is an acceptable cost per fall averted?) are not discussed.

Second, the reporting of the results lacks clarity in some parts. For instance, in Table 5 which summarises the cost and cost-effectiveness of all included studies, the currencies and price years used in the included studies are not reported throughout, nor are the results from the sensitivity analysis. Moreover, the authors' own calculations of the ICERs do not appear consistent (adjusted vs unadjusted incremental QALYs are used for different studies), and their interpretations seem at times different from the conclusions of the included studies (see Davis et al 2011b).

Third, and perhaps more importantly, any demonstration of cost-effectiveness needs to be weighed against the quality of the underlying economic evaluation, as also recognised by the authors of the systematic review (Winser et al. 2020). In this sense, only three studies seemed to show cost-effectiveness (Davis et al. 2011a, Davis et al. 2011b) or potential cost-effectiveness (Isaranuwatchai et al. 2017) of the interventions and were also assessed as good quality by the QHES scale. However, two of these studies also showed poor methodological quality in terms of the PEDro scale (Daviset al. 2011a, Davis et al. 2011b), which reiterates how cautiously the cost-effectiveness findings need to be interpreted. Therefore, as the authors conclude (Winser et al. 2020), there is no clear-cut message as to which exercise-based falls prevention programme intervention is most cost-effective for preventing falls in older people and the overall cost-effectiveness is still unclear. Subsequently, further research is required in this area to make any definitive decision for informing commissioning of these programmes. However current nice guidelines recommend that community dwelling older adults who present with a history or potential to fall should be offered a multifaceted falls risk assessment (NICE 2013). Where possible this should be provided by a healthcare professional with appropriate skills and experience and normally as part of a fall's prevention service (NICE 2013).

Further research (economic)

Economic evaluations investigating the cost-effectiveness of interventions in preventing falls in older people are needed to enrich the evidence base. New studies will clarify which interventions are more cost-effective, and which components are key determinants of cost-effectiveness. These economic evaluations should compare a wide range of alternative interventions across multiple settings with long-term time horizons, potentially adopting modelling techniques to integrate analyses based on primary data. Also, as the authors of the review highlighted, studies set in developing and underdeveloped countries are lacking. Moreover, common metrics of assessment need to be adopted. When clinical outcome measures enter the estimation of a cost-effectiveness outcome (e.g. cost per fall averted), clear thresholds are then needed to determine cost-effectiveness. The use of QALYs represents a positive example in this sense since, at least in certain jurisdictions like the UK (NICE 2013), a specific maximum acceptable ICER on the cost per QALY gained is set to delimit the cost-effectiveness region. Alongside new primary studies, there is a need to update this systematic review (whose searches were run until February 2019) and synthesise newer and older findings, while avoiding the shortcomings identified.

CPD reflective questions

1) What are the sources of heterogeneity in the included studies?
2) What outcomes were investigated in terms of cost-effectiveness?

3) Is there a clear-cut indication of what a cost-effective intervention to prevent falls in older people would look like?

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