



Review Article

Facilitators of and Barriers to Hip Protector Acceptance and Adherence in Long-term Care Facilities: A Systematic Review



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ABSTRACT

Keywords:
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Background: Hip protectors represent an attractive strategy for reducing hip fractures among high-risk fallers in long-term care facilities. However, clinical studies yield conflicting results regarding their clinical value. This is mainly due to poor acceptance and adherence among users in wearing these devices. As a result, there is an urgent need to identify potential barriers and facilitators to initial acceptance and continued adherence with hip protector use.

Purpose: The objective of this systematic review is to synthesize available research evidence to identify factors that influence acceptance and adherence among older adults living in long-term care facilities.

Methods: A key word search was conducted for studies published in English between 2000 and 2013 that employed quantitative, qualitative, or mixed-methods research designs. Two independent reviewers evaluated each article for inclusion, with a third reviewer when needed to resolve discrepancies.

Results: Twenty-eight articles met our inclusion criteria, and facilitators and barriers were clustered into 4 socio-ecological levels: system (eg, facility commitment, staff shortages), caregiver (eg, belief in the efficacy of protectors, negative perceptions), resident (eg, clinical risk factors for falls and related fractures, acute illness), and product (eg, soft shell, discomfort).

Discussion: The outcomes provide decision makers, health professionals, and caregivers with a greater awareness of strategies to improve compliance with the use of hip protectors. Furthermore, researchers can use this information to design clinical trials that yield high acceptance and adherence.

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About 1 in 3 older persons living in their own homes, and 1 in 2 residents living in long-term care (LTC) experience at least 1 fall each year.^{1–4} Although a small percentage of falls (ie, 10%⁵) result in serious injury, falls persist as the leading category of injuries and injury-related deaths among Canadians over the age of 65.⁶ One of the most debilitating injuries caused by falls are hip fractures, often

bringing excess mortality,^{7,8} declines in functional independence,^{8,9} diminished quality of life,¹⁰ and psychological distress^{11–13} (eg, delirium, depression, anxiety, and fear). In Canada, roughly 28,000 Canadians seniors are hospitalized for hip fractures each year, costing more than \$1 billion in direct treatment costs.^{14,15} The global incidence of hip fracture surpasses 1.7 million, and with baby boomers nearing old age, is projected to reach 3.94 million by 2025, and 6.26 million by 2050^{16–18} (even though age-adjusted rates are plateauing¹⁹). Because of their profound frailty and tendency to fall more frequently and severely (from a loss of effective protective responses), institutionalized older adults are up to 10.5 times more likely to break their hip during a fall than their community dwelling counterparts.^{20,21}

While the integrity of bone is crucial, the majority of hip fractures in older adults involve a sideways landed fall,¹⁴ with risk for hip

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fracture increasing 32-fold if direct impact occurs to the greater trochanter (GT).²² Accordingly, hip protectors have been promoted as a cost-effective and relatively immediate approach for prevention in the high-risk LTC environment,^{23–27} consisting of soft or hard shell pads embedded in specialized outer- or under-garments,²⁸ which utilize both energy cushioning and energy shunting mechanisms to mitigate the risk of hip fracture during falls.^{29–35} According to laboratory-based studies, hip protectors reduce peak impact forces to the hip by up to 40% during simulated sideways falls from standing.^{33–37}

Although findings are more optimistic for institutionalized than community-dwelling older adults, intention to treat type meta-analyses have yielded conflicting results regarding the clinical value of hip protectors.^{38–40} This is mostly explained by limited user adherence in the wearing of these devices, resulting in a large number of falls (and subsequently, hip fractures) occurring without any hip protection.^{38–40} However, when comparisons are drawn from analyses of protected vs unprotected falls, the relative risk of hip fracture is reduced between 69% and 80% when a hip protector is in place at the time of a fall.^{41–43} Thus, despite the observation of good biomechanical efficacy (more than equivalent to the best osteoporosis pharmaceutical treatments⁴⁴), poor adherence causes the intervention to appear ineffective. Still, there remains some controversy about the effectiveness of hip protectors even when compliance is good, mainly because of methodological flaws in design of clinical studies, and lack of performance regulations assuring the quality of available models for testing. For example, a randomized controlled trial by Kiel et al⁴⁵ (2007) conducted in US nursing homes found no evidence of a protective effect of an energy-absorbing/shunting hip protector on the risk of hip fracture, despite good adherence to protocol. However, the hip protector pad utilized in this trial (FallGard) has been shown to have very poor biomechanical performance in a recent laboratory-based study, attenuating only 2.9% and 12.4% of peak forces to the proximal femur at impact velocities of 2 m/s and 3 m/s, respectively.³⁴

Motivated by the potential benefits of this intervention, many studies have been published to examine the complex factors that influence initial acceptance and continued adherence in the wearing of hip protectors. In 2002, van Schoor et al⁴⁶ lead a systematic review of factors that influence acceptance of hip protectors, and adherence with guidelines concerning their use. However, the review did not attempt to distinguish determinants of compliance between community dwelling older adults and residents of LTC. As more LTC residents compared with community-living seniors struggle to manage multiple comorbidities and frailty,^{47,48} compliance in LTC should be determined less so by factors related to the individual user, and more so by caregiver and system-related factors. Furthermore, many studies have been conducted since publication of the initial review, with some producing contrary findings on the nature of barriers and facilitators in LTC. Therefore, the objective of this study is to synthesize available research to update our knowledge of perceived barriers and facilitators to initial acceptance and continued adherence in LTC, and to provide evidence-based strategies to improve these outcomes.

Methods

The intention of this systematic review was to identify articles encompassing a wide spectrum of evidence on barriers and facilitators to hip protector acceptance and adherence in LTC, drawing upon published literature inclusive of qualitative, quantitative, and mixed methods research articles.

Terms for electronic database searching were first developed for OVID Medline and were adapted to suit the requirements of the other citation databases (CINAHL, Ageline, Cochrane Database of Systematic

Reviews, Proquest). OVID Medline Medical Subject Headings included hip fractures; hip injuries; accidental falls; protective devices; and humans. Free-text search terms for Medline titles and abstracts included hip and protect*. Keyword search terms for other databases included: hip*, joint, injur*, protect*, pad*, fracture*, fall*, accidental, equipment, pad, and devices (*all variations of the keyword). Search results were restricted to English language articles published between January 2000 and December 2013. This time frame was selected for 2 reasons: (1) the previous systematic review by van Schoor and others (2002) included studies published up to June 2001⁴⁶; and (2) because of the evolution of hip protector technologies, older models available prior to 2000 might not be reflective of new trends in hip protector design. A supplemental search was performed by cross-referencing selected studies, contacting experts in the field for additional references, and reviewing the references of systematic reviews. The search for literature on evidence of barriers and facilitators to hip protector compliance in LTC facilities was part of a larger search that included studies in community and hospital settings. It was only in the final stage of data extraction that LTC studies were extracted. The term LTC is used to describe facilities for older adults where personal and nursing care is provided on a 24-hour basis (eg, nursing homes, residential care facilities).

Studies were included if they focused specifically on hip protectors as an intervention, or in which hip protectors were included as part of a multifactorial intervention or subgroup analysis. The samples of interest were adults of 65 years or older living in LTC facilities, family caregivers, and/or health care providers. For inclusion, the article must have presented findings related to hip protector acceptance and/or adherence, even though the primary purpose of the study may have been hip protector effectiveness.

A team of falls prevention researchers and LTC clinicians screened all abstracts for inclusion. Full text documents were obtained for those that met the inclusion criteria. Two independent members of the research team were then randomly selected to review each article. In the event of a disagreement, a third member of the research team was called upon to resolve the discrepancy.

In order to accommodate a diversity of reports, we adopted the narrative synthesis method described by Popay et al,⁴⁹ whereby reports were analyzed using tabulation and vote counting based on the following key data abstraction components: methodological approach, level of evidence, sample characteristics, hip protector characteristics, measurement of acceptance and adherence, and facilitators and barriers.

As the objectives of this synthesis are primarily to describe, classify, and explore relationships between studies rather than to conduct a meta-analysis of effects, assessments of risk of bias and other study quality appraisal techniques were not undertaken. However, to account for susceptibility to bias, each study was assigned a level of evidence (ie, I, II, III, IV) and a strength of recommendation (ie, A, B, C, D) using guidelines described in Shekelle, Woolf, Eccles, and Grimshaw⁵⁰ (Figure 1). Accordingly, barriers and facilitators derived from randomized controlled trial (I, A/B) were considered least susceptible to bias, whereas those from expert opinion (IV, D) were considered most susceptible to bias. The second stage of the synthesis involved an exploration of relationships between and within studies. If discrepancies existed in the nature of barriers and facilitators across studies, the highest level of evidence and/or strongest recommendation was used to discern the direction of relationships between factors and measures of acceptance or adherence.

Results

A total of 1086 potential articles were identified. Of those, 112 appeared potentially relevant and a hard copy was obtained for

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