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Falls-prevention programs for older ambulatory community dwellers: from public health research to health promotion policy

Summary

Objectives: Falls result in significant morbidity and mortality among the elderly. The purpose was to review the public health research literature on falls prevention among community-dwelling older adults and derive evidence-based implications for health promotion policy.

Methods: CINAHL, COCHRANE, EMBASE, MEDLINE, and PUBMED databases were used to search the research literature concerning falls epidemiology, injury mechanisms, and falls-prevention strategies published during 1966–2003.

Results: Falls affect one in three older adults living in the community and result in significant fall-related injuries that constitute an important and costly public health problem. There are numerous, but potentially modifiable, determinants of falls. Several community falls-prevention programs have been shown to reduce the incidence of falls and fall-related injuries.

Conclusions: The review suggests that there is compelling evidence from public health research to support health promotion policy for making societal investments in community falls-prevention programs.

Keywords: **Community – Falls – Intervention studies – Meta-analyses – Randomized controled trials.**

Falls constitute a leading cause of death among older adults in many parts of the world (Cesari et al. 2002). In the United States (U.S.), about one in three persons over the age of 65 years will experience a fall on an annual basis (Sattin et al. 1990; Tinetti et al. 1988). Of those who survive a fall, 20 to 30% will suffer moderate to severe injuries that often reduces mobility and limits independence. Falls also increase the risk of premature death (Alexander et al. 1992), and about two-thirds of first-time fallers are known to experience a second fall within a six-month period (Perry 1982). Of those fall injury events identified through population-based surveillance data, about 42% will result in hospital admissions with a mean length of stay of 11.6 days, and approximately 50% of fall injury events that occur at home and require hospital admission will result in discharge to a nursing home (Sattin et al. 1990). In addition to the physical costs in terms of disability, the direct economic costs of treating fall injuries are substantial (Englander et al. 1996).

Multiple falls, in particular, are significantly associated with increased functional disability levels, even after controlling for chronic conditions and functional disabilities at baseline (Dunn et al. 1992). Numerous fall-related complications that result in additional costs include fractures of the hip and other bones, joint dislocations, joint injuries other than dislocations, brain injuries, lacerations requiring hospitalization, internal injuries, dehydration, rhabdomyolysis, and pressure sores due to "long lie times," as well as fear of falling and dependence (Foley & Wolf-Klein 1986; Howland et al. 1998; Yardley & Smith 2002).

Among the known risk factors for falls, fewer than 10% are found to result from a loss of consciousness or extrinsic factors, such as being hit by an automobile (Speechley & Tinetti 1990). However, visual impairments, inappropriate eyewear (Lord et al. 2002), overuse of psychoactive medication (Joo et al. 2002), difficulties in gait and balance (Honeycutt & Ramsey 2002; Patla et al. 1992), and being underweight (Richter et al. 2002) or overweight with severe polyneuropathy, may all increase the risk of falls among older persons (Richardson 2002). In addition, environmental factors such as slippery surfaces, uneven floors, poor lighting, loose rugs, unstable furniture items, and a variety of obstacles and objects on floors may pose further risk of falling and serious injury (Speechley & Tinetti 1990; Richter et al. 2002). Other documented risk factors for falls include physical frailty, physical inactivity, alcohol misuse, cognitive and sensory

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impairments (Tinetti et al. 1988); a variety of pathologic or disease states of later life (Foley & Wolf-Klein 1986); health and functional status (Northridge et al. 1995); recent life events (Peterson et al. 2000); and individual behavioral factors (Kellogg International Work Group 1987). The failure to seek appropriate assistance from health care professionals and to employ prescribed preventive strategies (Stoddart et al. 2002) and the lack of targeted preventive and treatment services and other community resources (Hughes 2002) may also influence the rate of falls.

The risk of falling increases incrementally with the number of prevailing risk factors (Tinetti et al. 1988), specifically with the magnitude of potentially reversible risk factors (Cesari et al. 2002). Reducing one or more preventable fall-related risk factors will carry with it a proportionate reduction in fall frequency and injury risk (Speechley & Tinetti 1990). Strategies to reduce such potentially modifiable risk factors include physical activity programs to improve strength (Gillespie et al. 2001), balance and coordination (Cornillon et al. 2002), supervision to minimize the use of psychoactive medications (Ray & Griffen 1990), interventions that maximize control of comorbid conditions (Ray & Griffen 1990), and environmental assessments and modifications (Tideiksaar 1986). Others include the use of hip protectors (Richter et al. 2002), as well as specific shoe types and dietary amendments and supplementation (Fiatarone et al. 1994).

Falls and fall-related injuries can have a potentially devastating effect on the community-dwelling elderly and their families. Because falls often lead to poor quality of life, high health-care costs, and costly permanent institutionalization (Fox et al. 1996), the further development of policy that can support falls prevention research and implementation of practical intervention programs is emerging as an important public health issue (Cornillon et al. 2002). The purpose of this paper was to review the relevant public health research literature on falls prevention among community-dwelling older adults in an effort to derive evidence-based implications for health promotion policy.

Methods

We searched the CINAHL, COCHRANE, EMBASE, MEDLINE, and PUBMED databases to identify work published from 1966–2003 that reported assessments of the efficacy and effectiveness of falls-prevention programs for ambulatory community-dwelling older adults. The following keywords were used in the search: *Community-based interventions, Falls, Meta-analysis, Prevention,* and *Randomized controlled trials*.

We specifically focused on the results of meta-analyses on this topic and thereafter, on identifying multifactorial community falls-prevention programs conducted in the U.S. We also examined selected aspects of those public falls-prevention programs developed by the U.S. Centers for Disease Control and Prevention that we believed could help identify specific best practices, and their strengths and weaknesses, in this area that could help to direct future policy in community falls prevention.

We limited our search *a priori* in several ways. First, we excluded reporting on studies of nursing home or hospital-based populations, cost-effectiveness, determinants of intervention outcomes, and those that did not use a multifactorial approach. Second, we also excluded those randomized trials of falls prevention for community-dwelling people at high risk for falling that had not been conducted in the U.S. For a report on the overall results of all these trials, the reader is referred to Cumming (2002) and Gillespie et al. (2001). Finally, because this literature search was limited by design, and only a few well-designed trials were available on this topic, we present a narrative analysis of illustrative studies and their findings, rather than a more formal systematic review.

Results

Our literature search revealed 9 meta-analyses on interventions for preventing falls in the elderly. Among these, two were specifically related to hospital-based interventions, and three were related to exercise interventions. We also identified 23 published reports on community-based efforts to reduce the risk of falls using multifactorial approaches. Of these, 15 were conducted in countries other than the U.S., including Australia (n = 3), Canada (n = 2), France (n = 1), Germany (n = 1), Holland (n = 1), Japan (n = 1), New Zealand (n = 3), Scotland (n = 1), Spain (n = 1), United Kingdom (n = 1).

Of the 9 meta-analyses specifically related to falls-related prevention programs, the most comprehensive review was conducted by Gillespie et al. (2001). Gillespie and his colleagues examined the efficacy of randomized controlled trials of interventions designed to minimize risk factors for falls among the community-dwelling, including the institutionalized and hospitalized elderly. The main outcome of interest across studies was the number of falls. Although the specific application of the findings to community-dwelling elderly was difficult to extrapolate, the data from this meta-analysis revealed weak evidence for the effectiveness of single-element interventions (e.g., exercise or health education classes alone) in preventing falls. The authors noted that providers contemplating implementation of falls-prevention

programs should first consider screening the "at-risk" elderly, and then follow this with intervention programs designed to reduce the risk of falling due to both individual intrinsic and extrinsic causes (Gillespie et al. 2001).

Such a multifactorial approach has been undertaken in several extramural intervention programs designed to prevent falls among seniors that have been documented by the U.S. Centers for Disease Control and Prevention. Of these, one conducted by Ray et al. (1997) at Vanderbilt University, employed four primary prevention strategies: (i) risk assessment, (ii) education, (iii) tailored environmental modifications, and (iv) promotion of physical activity and muscle strength. Although they did not study the potential impact of the program among "at-risk" community dwellers, Ray et al. found recurrent fall rates for the intervention group to be 19% lower than those of the untreated control group when using this approach.

An earlier randomized controlled trial for preventing fall injuries and falls-related disabilities among older adults conducted by Wagner et al. (1994) did suggest, however, that a multidimensional prevention program could confer health benefits on ambulatory enrollees in a Health Maintenance Organization (HMO), although these benefits diminished in magnitude by the second year of follow-up. This study, based on a conceptual model proposed previously by the investigators (Wagner et al. 1992), supported the notion that altering fall-related risk factors has the potential to reduce the prevalence of falls and prevent, or at least delay, some of the disability associated with falls. The study had three arms: (i) an experimental intervention of nurse visits, lasting 60 to 90 minutes to assess risk factors and then followed up with a tailored behavioral intervention to address the identified risk factors; (ii) a comparison group, which received only a nurse visit for chronic disease prevention; and (iii) a control group constituting usual HMO care. The population sample studied was well-educated, largely white, non-disabled and health-conscious, which may explain the observed short-term results on fall numbers and disability of the experimental and comparison groups. However, the intervention may not have been intensive enough, or not adapted sufficiently, to facilitate sustained benefits.

Consistent with the proposed need for a multidimensional falls prevention model incorporating the psychological, physical, environmental, and behavioral determinants of falls, Hornbrook et al. (1993) developed the Senior's Program for Injury Control and Education (SPICE). The SPICE intervention approach, grounded in behavioral self-management principles, emphasized behavior change. The focus of the multiple, moderate-intensity group behavioral strategies was on exercise and home safety improvements, and included the use of mental imagery to improve sensory awareness and practice of behaviors critical to preventing falls. The intervention was designed to increase the participants' sense of self-control with the hope of achieving sustainable post-intervention effects. Results showed that the SPICE intervention group had a reduced odds ratio for falling during the 23-month study period, but, surprisingly, the numbers of falls requiring medical treatment did not decrease (Hornbrook et al. 1994).

In contrast, another study of 36 subjects treated at a "falls clinic" (Wolf-Klein et al. 1984) similarly involved multiple-component intervention and counseling on an individualized basis by an interdisciplinary team. The results of this study, while contrary to those of Reinsch et al. (1992) and Coleman et al. (1999), who found no significant improvements in proportion of falls after 24 months of either chronic care clinic intervention or usual care, showed that a high percentage (77%) of cases experienced no further falls over the study period and a modest percentage of cases (16.6%) fell less frequently. Only 5.5% continued to fall with the same frequency described prior to intervention. Unfortunately, while community dwellers at high risk for falls were studied, the study sample was small and, unlike the studies by Reinsch et al. and Coleman et al., there was no control group. A similar problem was noted in the report by Yates and Dunnagan (2001). Although they claimed that their home-based falls risk-reduction program for rural community-dwelling older adults in the intervention group showed statistically significant improvements in fall-related risk assessments compared to those in a control group after 10 weeks, complete data were only available for 37 community-dwelling subjects. Moreover, although the components of the program seemed well-designed and included a home-based exercise program, nutrition counseling, and education about environmental hazards, the actual number of falls was not measured, the degree to which subjects were at risk for falls was unclear, and the study duration was limited.

Tinetti et al. (1994) studied the effects of a multifactorial intervention, including exercise and behavioral recommendations, on the risk of falling among 301 elderly men and women living in the community. In their study of individuals who were enrolled in a HMO and who were identified as having at least one risk factor for falling, they found a 30% reduction in the proportion of intervention subjects who fell, but who had not necessarily fallen previously. Impairments in toilet-transfer and gait, however, were similar among the two groups, and a high proportion of the control subjects who had received usual health care plus social visits had similar reductions or improvements in the measured risk factors. In addition, while a more recent study has shown a

significant decrease in the risk of further falls and functional impairment after exposure to an interdisciplinary falls-prevention program, this study and other similar studies were not conducted in the U.S. (e.g., see Day et al. 2002; Steinberg et al. 2000).

Thus, while several studies support a compelling case on theoretical grounds for the potential efficacy of multifactorial interventions in preventing falls and fall-related injuries (Cumming 2002), and evidence from trials in countries other than the U.S. seems promising (Day et al. 2002; Steinberg et al. 2000), larger and more well-controlled prospective international studies of the community-dwelling elderly at "high risk" for falls are needed to generate additional evidence of the efficacy of multifactorial risk-abatement strategies. Furthermore, even though *Guidelines for the Prevention of Falls in Older Persons* have recently been developed under the auspices of the American Geriatrics Society (2001), because no gold standard exists for identifying community-dwelling individuals who are at "high risk for falling," more research on what precisely constitutes risk is needed. Further study is also necessary to understand whether the delivery of information tailored to the unique requirements of each individual, which is supplemented by group activities and emphasizes the positive benefits of health promoting activities, is beneficial. Other barriers that need to be recognized and overcome in order to advance intervention practice in falls prevention are listed in Table 1, which summarizes the program elements and strengths and weaknesses of U.S. Falls Prevention Programs for Seniors that have been implemented by state and local health departments and documented by Parra and Stevens (2002).

Discussion

In light of the growing proportion of the elderly in the U.S. and other developed nations, the consequences of falls among the elderly, and the documented potential for preventing both the number and severity of injuries due to falls (Cesari et al. 2002), we believe that new attention must be focused by governments and the private sector on addressing the costly public health problem of falls. Our review of the relevant literature points to the need for bold health promotion policy that is backed by societal investments that can foster high-quality standards for collaborative efforts to systematize the collection of fall-injury surveillance data and implementation of fall-prevention programs that have been shown to be effective.

In addition, health promotion policies that both permit and actively facilitate community health agencies and related medical personnel to more adequately define and identify community-dwelling individuals at high risk for falls are imperative. Providing support for community-wide implementation by well-trained personnel of specific evaluative and screening programs for identifying individuals at risk, but who have no falls history, through well-organized and managed health screening centers, are also critical to community falls prevention. Such efforts can facilitate the identification and reduction of potentially modifiable behavioral risk factors for falls among community-dwelling elders, as well as among those who have a history of falls and require additional intervention. Individuals identified as being at high risk for future falls, e.g., those who are sedentary, physically compromised, or those who have recently experienced important life events, should be made a high priority.

There is mounting evidence suggesting that assessments of home environmental risk factors and their remediation can

Table 1 Summary of key components of U.S. Fall Prevention Programs for Seniors (Parra & Stevens, 2002)

Target population	Start/ finish	Program elements	Strengths	Weaknesses
People age 60 and older in Tucson, Arizona	1997–	Assesses environmental, medical and behavioral risks in client's home	Seniors are responsive to program and recommendations	Funding is limited and limits numbers and types of services that could be implemented
Anyone 18 years or older who is homebound in Phoenix, Arizona	1995–	Volunteers review home safety with client and make needed repairs	Strong collaboration exists between public health agency and volunteer program	Only homebound and/or disabled are eligible
People age 65 and older living in San Francisco, California (CHIPPS)	1988–	Creates awareness that injuries can be prevented, and trains providers about injury, offers counseling and referrals and free home safety modifications to seniors who participate in sponsored educational presentations	Is comprehensive with an extensive educational component that trains providers	Funding is limited in terms of staffing, and extent of home modifications

Table 1 (continued)

Target population	Start/ finish	Program elements	Strengths	Weaknesses
Renters and homeowners of any age with fixed or limited incomes in Los Angeles, California	1977–	Offers free safety and falls prevention education and folders of community resource information, workshops on personal safety, free home modifications	Costs of repairs are provided and charge is covered by program, and information is available in several languages, plus staff are bilingual	Program does not conduct home assessments, but relies on client to be aware of hazards or have these assessed by outside sources
Adults older than 65 years in New Haven, Connecticut	1999–	City contracts with visiting nurse association to conduct fall injury prevention program for seniors	The nurse specialist is experienced in working with clients in their own home, which helps reduce seniors fear about home safety assessment	Program is not able to undertake repairs such as installing grab bars, railings
Frail elderly 60 years and older in Waterbury, Connecticut	1993–1997	Program staff conducted free in-home safety assessments, and repairs needed were partially subsidized	Program directly helped with repairs, at minimal cost to clients	Funding has been discontinued, only educational component remains
Visiting Nurse Association Community Healthcare patients age 60 years and older who live in East Connecticut	1996–	Nurses provide home safety visits and work with older adults/caregivers to correct hazards	Assessment and interventions are thorough and include free safety equipment and educational materials	There is a limit of 1–2 safety repairs per client
People age 60 years and above in Pocatello, Idaho	1998–	Offers public presentations in senior centers, and other venues, conducts medication reviews, home assessments, and makes suggestions for repairs and offers exercise library for homebound	Offers diverse array of services	Program does not directly provide repairs, but provides referrals
People 60 years and older, in 7 Kentucky Counties	1997–	Provides seniors materials to do home assessment, and makes recommendations	Provides comprehensive assessment home hazards, and free assistance to implement changes	Funding
People age 55 years and older in Baltimore metropolitan area	1989–	Offers a variety of programs to assist older residents with home modifications	Provides portable display showcasing home modification ideas; home assessments; home adaptations assistance, education, funding visits and re–evaluations	Program offers few repair services Some educational materials have to purchased
People age 55 and older or persons of any age with disabilities	1995–	Goal is to help seniors and the disabled to live independently and comfortably in their own homes	Workforce are trained to identify potential hazards in homes and eliminate them, modifications can be made for a set charge	A senior must be a paying member of program to receive services
People age 60 and older in 3 Pennsylvania counties	1996–	Provides a multifaceted approach covering public awareness, education, exercise, home safety, clinical assessments	Two separate work groups address home safety and exercise issues, education is widely promoted, volunteers assess homes for safety and provide repairs	Program needs to provide more staff to follow up on safety recommendations
People age 60 years and older or younger disabled people in Utah	1994–	Addresses safety issues for each individual	Conducts home safety checks, education, assistive devices	Another resource must provide necessary installations Funding sources have restricted purchases of new equipment
Targets seniors and younger people with disabilities or those at risk for falls in York County, Virginia	1995–	Attempts to increase falls awareness and promote fall prevention modifications	Program offers education, surveillance, home screening and modifications	Repairs are not provided directly
People age 60 years and older in central Ohio	1996–	Program provides resources for fostering safe living	Information and referrals are free, a physician is able to conduct assessments, advice on home repairs is offered	Program does not provide repair services, although it helps with locating resources

abate the incidence and severity of falls injuries (Day et al. 2002). Locating in older people the responsibility for checking home hazards, and taking preventive actions to reduce these, needs to be empirically examined. Moreover, because a high percentage of falls occur outside of the home, those environmental risk factors that predispose the elderly to falls in the community should also be assessed and targeted for abatement where feasible.

In order to foster high-quality standards for health-care practice, policies to support well-designed evaluation studies that can determine whether community dwellers are likely to gain additional benefits from individualized intervention strategies directed towards enhancing their nutritional, physical and mental status, and especially their walking patterns, are needed. Policy also needs to support research on the value of individualized interventions designed to reduce potentially modifiable risk factors for falling, such as poor lighting and inappropriate eyewear, supplemented by group education that promotes self-management and healthy behaviors that might likewise prove beneficial.

Although falls-prevention programs in nursing homes have been reasonably well developed in recent years, the vigorous, healthy and noninstitutionalized elderly living in the community are probably at greater risk of incurring more serious injuries than nursing home residents, who typically have poor functional status due to the potentially greater impact of falling (Speechley & Tinetti 1990). Approximately half of the community-dwelling population older than 85 years of age will fall each year (Tinetti et al. 1988). As a consequence, the specific needs of this group should not be overlooked. Furthermore, although fewer people below age 85 living in the community fall each year, with only a relatively small proportion of fallers experiencing multiple falls, the psychological consequences of falling and injuring oneself should not be underestimated and need to be addressed. The psychological consequences of falling are important because falls markedly reduce one's self-confidence, the threshold for future injury, survivorship, and morale (Mossey 1985). Thus, mitigating the fear of falling (Howland et al. 1998), which can severely limit activities and independence among the elderly (Speechley & Tinetti 1990), and identifying those at increased risk for falling because of such fear, should be essential components of any fall risk-abatement strategy.

Falls result from multiple individual and environmental determinants. The literature demonstrates that most of the important individual risk factors for falls, such as gait and balance abnormalities, poor vision and inappropriate eye-wear, excess medication intake, poor nutrition and muscle and bone atrophy, are amenable to intervention. However, partnerships between federal, state and local healthcare system will be necessary to finance and support the implementation of community programs of risk assessment and environmental change if we are to reduce the high mortality and morbidity rates associated with falls. This means making investments in training community-based personnel to implement and evaluate specific intervention strategies that have been identified as best practices. These strategies should include tailored falls-related health education, counseling, physical activity, and group activities and other forms of intervention that have the potential to reduce individual-level risk of falling. In addition, the necessary equipment and environmental modifications both in and outside of the home constitute system-level changes that falls-prevention policy must support.

Finally, if we are to reduce falls among community-dwelling elderly, society needs to commit to provide adequate funding support to build community capacity to address the problem of falls. Such funding could foster and support home-visit programs and falls clinics that provide regular opportunities for risk assessment and for evaluating compliance with prescribed therapeutic regimens, both in metropolitan and in rural areas. Moreover, legislation is needed to optimize safety and falls prevention in existing and new facilities that house or serve the older person. This would include providing adequate medical coverage and funding for counseling needed to help the elderly overcome the fear of falling, promoting exercise programs to improve strength and balance, and providing public financial support to subsidize environmental modifications to housing. Media and political advocacy campaigns designed to broaden the public's understanding of the value and impact of such community-based falls-prevention programs should also be a high priority.

Conclusions and policy implications

The foregoing review and discussion suggests that systematic efforts to implement risk assessment and intervention strategies that utilize a combination of intervention elements for preventing falls and fall-related injuries promise to have several important social and economic implications. First, such efforts can lead to more efficient use of limited societal resources to improve both individual health and community environmental change. Second, such efforts are likely to reduce morbidity and mortality rates attributable to falls among community-dwelling elderly at high risk for falling, thus improving functional status and promoting independent living. Third, by emphasizing health promoting behaviors and confidence-building, such efforts may provide

an effective means of increasing an individual's threshold to injury, thus reducing the extent of morbidity that might otherwise be experienced by elderly community dwellers who are at risk for falling and do fall. There is compelling evidence from public health research to support health promotion policy for making societal investments in such efforts to prevent falls and their consequences. Implementing the results of such research constitutes an important next step in the agenda to ensure an optimal quality of life for the growing numbers of community-dwelling elderly.

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Zusammenfassung

Fallverhinderungsprogramme für ältere Mitbürger in der ambulanten Versorgung: von der Public-Health-Forschung zur Gesundheitsförderungspolitik

Fragestellung: Fallen verursacht ernstzunehmende Morbidität und Mortalität unter der älteren Bevölkerung. Wir untersuchen die Literatur über Fallverhinderung in Hinsicht auf ältere Mitbürger, und machen Vorschläge zur Gesundheitsförderung.
Methoden: Untersucht wurde die ausschlaggebende Literatur über Fallverletzungen, Epidemiologie, Mechanismen der Fallverletzung, und vorbeugende Strategien, veröffentlicht während der Periode von 1966–2003. Diese Untersuchung beruht auf den folgenden Datenbanken: CINAHL, COCHRANE, EMBASE, MEDLINE, und PUBMED.
Ergebnisse: Einer von drei älteren Erwachsenen in der Gesellschaft ist von durch Fallen verursachten Verletzungen betroffen. Solche Verletzungen erzeugen ein teures und ernstzunehmendes Problem für die öffentliche Gesundheitspflege. Es gibt zahlreiche, aber möglicherweise vermeidbare Ursachen für das Fallen. Es wurde gezeigt, dass mehrere gemeinschaftsgegründete Programme zur Verminderung des Fallens und der durch Fallen verursachte Verletzungen beitragen können.
Schlussfolgerung: Ausgiebige und zwingende Forschung über die öffentliche Gesundheitspflege zeigt, dass es nützlich ist, sozialpolitische Investitionen in gemeinschaftsgegründete Fallverhinderungsprogramme zu machen.

Résumé

Programmes de prévention des chutes à domicile des personnes âgées: des recherches de santé publique aux mesures de promotion de la santé

Objectif: Les chutes peuvent causer des grandes frayeurs et tuer des personnes âgées. Cet article passe en revue la littérature scientifique sur la prévention des chutes à domicile des personnes âgées et en déduit des règles de promotion de la santé, basées sur des données probantes.
Méthode: Nous avons utilisé les bases de données publiques CINAHL, COCHRANE, EMBASE, MEDLINE, et PUBMED pour identifier les publications entre 1966 à 2003 portant sur l'épidémiologie des chutes, les mécanismes de traumatismes et les stratégies de prévention des chutes.
Résultats: Une personne âgée sur trois fait des chutes à domicile avec des lésions graves. Il s'agit d'un problème important et coûteux pour la santé publique. Les causes des chutes sont nombreuses et parfois modifiables. Plusieurs programmes de prévention ont réussi à réduire les chutes et les blessures qu'elles entraînent.
Conclusion: Cette revue suggère qu'il y a des preuves indiscutables en faveur d'une politique de promotion de la santé publique par la prévention des chutes dans la communauté.

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