Chapter 3

Interventions to Prevent Falls Among Older Adults

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3.1. INTRODUCTION

Falls consistently rank among the most serious problems facing older persons and cause a tremendous amount of morbidity, mortality, and disability (Brown, 1999; Nevitt, 1997; Robbins et al., 1989; Rubenstein, Josephson, & Robbins, 1994; Tinetti, Williams, & Mayewski, 1986). At least a third of community-dwelling people aged 65 years and older fall each year (Centers for Disease Control and Prevention [CDC], 2005; Campbell, Spears, & Borrie, 1990; Rubenstein & Josephson, 2002), and the rates in nursing homes and hospitals are considerably higher (Rubenstein & Josephson, 2002). In 2002 in the United States, falls were responsible for 12,800 deaths and 1.64 million visits to hospital emergency departments (EDs) (CDC, 2005). In addition to physical injury, falls can have major psychological and social consequences. Fear of falling and loss of self-confidence can cause seniors to limit their activities and lead to reduced mobility, decreased physical fitness, and increased fall risk (Brown, 1999; Clark, Lord, & Webster, 1993; Vellas, Wayne, Romero, Baumgartner, & Garry, 1997).

A recent economic analysis of medical payments (rather than billing costs used in earlier calculations) found that in 2000 the direct medical cost of fatal and nonfatal fall injuries was $19.5 billion (Finkelstein, Chen, Miller, Corso, & Stevens, 2005). Of $19.3 billion for nonfatal injuries, 63% ($12.1 billion) were for injuries that required hospitalization, 21% ($4.1 billion) were for injuries treated in EDs, and 16% ($3.1 billion) were for injuries treated in outpatient settings. Overall, falls account for 6% of all medical expenditures for persons aged 65 years and older in the United States (Bernstein & Schur, 1990; Rubenstein, Powers, & MacLean, 2001).

This chapter provides an overview of our current knowledge about fall risk factors, evidence for intervention strategies in various settings, implications for public health practice, and future research needs.
3.2. RISK FACTORS

Epidemiologic studies have identified numerous fall risk factors. These are frequently classified as either intrinsic (i.e., originating within the body, such as leg weakness, balance disorders, and visual deficits) or extrinsic (i.e., originating outside the body, such as environmental hazards). Some researchers have further expanded this classification to include behavioral and social/economic risk factors (Scott, Dukeshire, Gallagher, & Scanlan, 2001), although the evidence for some factors is indirect (e.g., low income is highly associated with poor health status and disability, which, in turn, are associated with increased fall risk) (Evans, Barer, & Marmor, 1994; Raina, Dukeshire, Chambers, Toivonen, & Lindsay, 1997). Table 3.1 summarizes this broader representation.

Based on a recent literature review, the most important risk factors include muscle weakness, a prior history of falls, difficulties with gait and balance, visual impairment, arthritis, functional limitations, depression, and the use of psychotropic medications (Rubenstein & Josephson, 2002). However, falls rarely have a single cause. Most are the result of an interaction between a number of risk factors, and risk increases with the number of factors present (Nevitt, Cummings, Kidd, & Black, 1989; Robbins et al., 1989; Tinetti et al., 1986; Tinetti, Speechley, & Ginter, 1988). For example, in one survey of community-dwelling older adults, the proportion of people who reported falling increased from 27% for those with no or one risk factor to 78% for those with four or more risk factors (Tinetti et al., 1988).

3.3. FALL PREVENTION INTERVENTIONS

The high incidence of falls among older persons, combined with high susceptibility to injury—the result of age-related physiological changes (e.g., decreased muscle strength and endurance, delayed reaction times, slower reflexes) and a high preva-