

Motivating Elders to Initiate and Maintain Exercise

Edward M. Phillips, MD, Jeffrey C. Schneider, MD, Greg R. Mercer, MSN, APRN-BC

ABSTRACT. Phillips EM, Schneider JC, Mercer GR. Motivating elders to initiate exercise. *Arch Phys Med Rehabil* 2004;85(Suppl 3):S52-7.

This article addresses the motivation of elders to initiate exercise. It is part of the study guide on geriatric rehabilitation in the Self-Directed Physiatric Education Program for practitioners and trainees in physical medicine and rehabilitation and geriatric medicine. This article specifically focuses on the health benefits of exercise, describes a theoretical model for assessing and improving an individual's motivation to pursue exercise, details the particular challenges elders face in initiating and adhering to an exercise program, and outlines professional interventions to address these obstacles.

Overall Article Objective: To explore the particular challenges elders face in motivation to exercise and to develop a systematic approach for counseling elders toward greater activity.

Key Words: Elderly; Exercise; Geriatrics; Motivation; Physical effort; Rehabilitation.

© 2004 by the American Academy of Physical Medicine and Rehabilitation

MOTIVATING PEOPLE TO INITIATE and maintain a program of regular exercise remains a critical and unmet challenge in 21st century America. Exercise is a proven, highly beneficial, and strikingly underused health promotion modality.¹ Both clinicians and their elderly patients continue to neglect it.^{2,3} Elders commonly report they cannot, will not, or should not exercise.^{1,4-6}

In sharp contrast to other health-promoting behaviors,⁷ physical activity declines progressively with age.⁸ As a result of inactivity, elderly persons experience preventable functional decline, loss of independence, and increased disease burden. Many lack the strength, flexibility, or endurance to rise from a chair, walk, or dress independently. Exercise can delay, prevent, or even reverse these effects. Elders benefit more functionally from exercise than do younger people; yet, they exercise less. Considering the particular challenges that the elderly face in initiating exercise, it is essential to explore how health professionals can best motivate their elderly patients.

This article touches on the health benefits of exercise for older adults, it describes a theoretical model for assessing and improving motivation to pursue exercise, and it details the particular challenges elders face in initiating and adhering to an exercise program. Last, suggestions for professional intervention to address these obstacles will be described.

From the Department of Physical Medicine and Rehabilitation, Harvard Medical School, Spaulding Rehabilitation Hospital, Boston, MA (Phillips, Schneider); and Department of Geriatrics, McLean Hospital, Belmont, MA (Mercer).

No commercial party having a direct financial interest in the results of the research supporting this article has or will confer a benefit upon the author(s) or upon any organization with which the author(s) is/are associated.

Reprint requests to Edward M. Phillips, MD, Spaulding Rehab Hosp, Harvard Med Sch, 125 Nashua St, Boston, MA 02114, e-mail: ephillips1@partners.org.

0003-9993/04/8507-9215\$30.00/0
doi:10.1016/j.apmr.2004.03.012

IMPORTANCE OF EXERCISE IN THE ELDERLY

In the geriatric population, physical activity is beneficial. Physical activity promotes health, slows disease progression, and prolongs functional independence.^{1,9-11} Researchers have identified an inverse relationship between total physical activity and mortality.¹² In fact, physical activity initiated late in life positively affects mortality, effectively delaying death, even after statistics are corrected for comorbidities such as smoking, obesity, and hypertension.¹³ Physical activity has a profound effect on elders' functional level. An analysis of 10,000 older adults found that those most active were twice as likely as sedentary people to die without disability.¹⁴ Indeed, the pattern of "normal" functional losses with aging in large part reflects deconditioning in this population.¹⁵

Despite the preponderance of evidence showing the health benefits of exercise and the support of many large health care organizations, most elders are not physically active.^{16,17} As a subpopulation, the elderly are less active than the general population.⁸

The growing wealth of literature documenting the health benefits of physical activity among the elderly has spurred many health care organizations to issue consensus statements extolling exercise for elderly persons. The National Institutes of Health emphasizes the importance of physical activity and recommends universal exercise counseling for older adults.¹⁸ The American College of Sports Medicine,¹⁹ American Heart Association, American Academy of Family Physicians, American College of Obstetricians and Gynecologists,²⁰ and the US Surgeon General's Office²¹ have all endorsed exercise promotion for the elderly.

MOTIVATION

Motivation is defined as the forces acting on or within a person to initiate a behavior.²² This definition provides a framework that includes both intrinsic and extrinsic factors. Understanding motivation as more than an inert part of an individual's personality may strengthen care providers' efforts to motivate their elderly patients and can provide elderly persons with the tools to empower themselves to become self-directed about exercise participation. Multiple motivational models have been developed in the literature, speaking to the complexity of the task of motivating people to exercise. Although research suggests motivational factors that are amenable to intervention, no consensus has emerged regarding a theoretical framework for activity promotion research or practice.²³

Understanding the Motivation Equation

The following equation (fig 1), adapted from Geelen and Soons,²⁴ encompasses 4 subjective factors. Their subjective nature is important because an accurate perceived prognosis by the individual is the best predictor of success.²⁵ Yet, each factor is modifiable and may be influenced through education, experience, and coaching to improve motivation to adopt and maintain exercise.

The first factor, perceived chance of success, is most critical. It encompasses interrelated factors: How strongly does the person believe that one determines one's own destiny or more specifically shapes one's own health? How confident does the person feel regarding activity? What has the person learned

$$\text{Motivation} = \frac{\text{Perceived Chance of Success} \times \text{Perceived Importance of the Goal}}{\text{Perceived Cost} \times \text{Inclination to Remain Sedentary}}$$

Fig 1. Motivation equation.

from past experience? Even if they strongly value and clearly understand the benefits of activity, elders who believe they will fail are unlikely to initiate any exercise program. Perceived importance of the goal is also important. How will achieving the goal change their life? How valuable do those changes seem?

The denominator of the motivation equation includes the perceived costs of attempting exercise. The cost may be economic, such as joining a gym or buying sneakers, or the cost may be risk of failure, pain, fatigue, or loss of time or energy. It also includes the inclination to remain sedentary, that is, the perceived benefits and value of avoiding activity.

People decide whether to adopt or reject behaviors based on the balance of their appraisal of these 4 factors. For example, let us consider a 68-year-old woman who has advanced osteoarthritis of her knees and is pondering whether to pursue a daily walk around the neighborhood. Although the walk is a familiar routine, this woman considers that occasionally she is unable to complete it because of pain in her knees, which impacts her perceived chance of success. Second, she considers regular physical exercise an essential part of remaining independent and living in her own home; therefore, she has a high perceived importance of the goal. However, she also recalls that most of her walks have been accompanied by some knee discomfort, a perceived cost. She would rather go for a walk than sit in front of the television: her inclination to remain sedentary is low. She weighs her desire to avoid temporary discomfort and possible failure against the long-term benefits of a daily walk and finally comes to a decision.

Clearly, a shift in any of these factors will affect her motivation. Her physician may modify these factors to improve motivation and the chance that she will pursue a daily walk. Appropriate treatment of her knee pain with medications, support wraps, and topical liniments reduces the perceived cost. Educational materials and counseling about the risks of worsening function and increased pain from sedentary behavior reduce her inclination to remain sedentary. Finally, advising her to join a walking group with others who have similar arthritic complaints may provide a behavioral model of success, thereby increasing her perceived chance for success. It also offers valued social contacts, enhancing the perceived importance of exercising.

OBSTACLES TO MOTIVATION

It is helpful to organize obstacles to exercise motivation according to the 4 elements of the motivation equation: odds of success, importance of goal, costs, and inclination to remain sedentary.

Perceived Chance of Success

Self-efficacy. In a review of exercise determinants,²³ self-efficacy was the strongest predictor of exercise in a majority of studies. Self-efficacy is perceived capability and confidence, specific to a particular domain of behavior.²⁶ In elders, self-efficacy predicts exercise adherence, fear of falls, physical functioning, social decline, and survival.^{27,28} Elders exhibit less exercise self-efficacy than other age groups.^{29,30} Exercise with appropriate coaching can bolster elders' self-efficacy.^{9,27} Furthermore, elders benefit most from age-matched behavioral

models,²⁹ for example, coaching from other older adults who exercise successfully.

Perceived control over one's health. Similar to self-efficacy, locus of control refers to the sense of how much control a person has relative to his/her external environment. Although studies have found no uniform change in perceived control of health with aging, environmental and social factors can affect one's sense of control over one's own health.^{30,31} Ageist stereotypes, such as incompetence, disability, frailty, senility, inactivity, and decline, are all detrimental to elders' sense of control. Control-enhancing interventions have resulted in improved alertness, energy, mood, memory, and self-reported satisfaction.³²

Comorbidities. Medical illnesses are common among the elderly and often affect their perceived health and chance of success. Symptoms such as stiffness, pain, shortness of breath, fatigue, weakness, and numbness often discourage physical activity. People with cardiac, pulmonary, or rheumatologic problems are often told by their physicians to be careful with physical activity. Some patients receive this advice as a prescription for inactivity. In reality, very few people are prohibited from physical activity outright (see Bean et al¹⁵ focused review), and the vast majority would benefit from greater activity, despite their medical conditions.

Both elders and clinicians underestimate the effects of disease on functioning, thereby delaying intervention. In 1 sample,³³ elders tended to underreport disability or to report it only when they reached an intolerable threshold. In the same sample, two thirds of clinicians who did not explicitly ask their patients about function overestimated their abilities. Without an accurate assessment of a person's needs and abilities, it is difficult to implement an appropriate physical activity program.

Behavioral factors. Behavioral research suggests that success begets success.²⁶ Positive experiences tend to improve perceived control and self-efficacy and to reduce perceived barriers, thereby motivating an individual to exercise. Starting with challenging but achievable short-term goals, and progressing gradually, maximizes one's chance of success. Sustained exercise improves perceived efficacy.⁹ Past experiences, failures, and obstacles, as well as successes, also influence activity preferences and should be part of an activity assessment.

Perceived Importance of Goal

Beliefs and education. As a result of their educational background and life experiences, the current cohort of elders has developed a set of beliefs that differs from those of the rest of the population.³⁴ Especially important, elders experienced a health care system very different from today's system. The system they encountered was more focused on cure and less on prevention, more paternalistic, and driven by an outdated understanding of pathophysiology and the benefits of activity. Through much of their lives, today's elders were counseled that the appropriate treatment of illness necessitated physical inactivity. For example, the standard of care for myocardial infarction and back pain used to call for prolonged periods of bedrest; now, exercise is standard practice. Some arthritic patients believe they should not exercise. A better understanding of one's own medical problems helps define the importance of physical activity. Given the proven protective role of physical activity in

many diseases, including coronary artery disease (CAD), diabetes, and hypertension, better educated patients are more likely to integrate the importance of physical activity into their decision-making process.

Elders may also hold outdated conceptions of activity itself. For example, they may believe that beneficial physical activity consists only of running or lifting weights at a gym but does not include carrying groceries or walking the dog. Another misconception involves viewing activity goals in absolute or rigid terms that exaggerate the cost of activity. Some believe that if they cannot walk for 1 hour they obtain no health benefit. Such "all-or-nothing" thinking can hamper the development of an achievable, acceptable, graduated activity program.

Importance of health. The relative importance elders attach to their own health affects their perceived importance of activity. Elders note the high priority of health among their values, and in 1 study³⁵ they were more health-conscious than younger subjects. In general, the prevalence of health-promoting behaviors increases with age,⁷ with the notable exception of activity.^{16,17} However, 1 survey³⁶ reported that elders increased their participation in physical activity at a faster rate than did any other adult age group.

Definition of health. Definitions of physical fitness and health vary considerably among people^{7,37,38} and particularly between clinicians and their elderly patients. Elders often de-emphasize disease.^{7,37,38} Rather, they focus on function, maintaining roles, independence, and comfort. Knowledge of a patient's definition of health enables the clinician to address his/her specific health concerns. For example, an elderly person may find the notion of ambulating with a walker unappealing but may accept it as an interim step toward ambulating with a cane or no device.

Perceived Costs

Perceived barriers. Perceived barriers are a powerful negative predictor of physical activity.²⁹ Although wide individual variation is the rule, overall obstacles to physical activity tend to change with age and seem to increase for many elders. Elders report that time, money, and family commitments are less significant barriers with increasing age. Availability of an exercise partner, illness, injury, and fear of injury become more prominent concerns.³⁹ Intrinsic barriers include falls, fear of falls, injuries, crime, illness, pain, body weight, body image, discipline, skills, knowledge, lack of pleasure, and overestimating the time or effort needed for activity. Extrinsic barriers include limited funds, transportation, parking, weather, available exercise partners, exercise facilities, peer exercise group, accessible exercise routines, and instruction.^{6,26,29,38,40-48}

Access. Some environmental factors affect elders' perceived cost. Elders require accessible physical activity environments. Such factors as transportation, parking, location, ambiance, ventilation, lighting, refreshments, changing and toilet facilities, floor surfaces, and disabled access are all elements of an ideal setting for physical activity. In addition, the presentation of physical activity instruction may require audible and visible formatting tailored for elders.⁴⁹

Demographics. As a group, women exercise less than men.⁵⁰ In 1 survey,³⁸ female gender was the single strongest negative predictor of self-rated activity. Women also suffer disproportionately more physical disability than men⁶ and report less physical exercise self-efficacy.²⁷ Additionally, women seem to experience higher barriers to activity. Reported barriers include spousal care, stress, depression, body image, urinary incontinence, and poverty.^{6,51} Considering their matrix of less activity, greater longevity, and more physical disability,

elder women have more to gain from increased activity than men.

In addition to gender, membership in a minority population or low socioeconomic status are negative predictors of activity,^{28,42} suggesting that a greater burden of barriers may be involved in these cases.

Demographic factors are largely immutable and people vary widely, requiring individualized assessment. Nevertheless, being cognizant of demographic issues may help clinicians assess and tailor activity programs. It also helps identify individuals at relatively high risk for inadequate exercise and increased barriers.

Inclination to Remain Sedentary

Habits and prior experiences. It is commonly understood that it is easier to remain active if one is already in the habit of regular physical activity. Elderly persons are at a disadvantage because fewer grew up with this habit of physical activity. Childhood-organized sports, as well as gyms and clubs, were a less developed aspect of society when today's elders were young. Because the health benefits of exercise were not as well established, people were less likely to make a habit of physical activity.

Psychologic issues. Elderly are affected by depression more commonly than the rest of the population. One cardinal feature of depression is anhedonia, a lack of interest or pleasure, which affects one's ability to initiate activities, including physical activity. Also, elderly persons suffer disproportionately more personal loss than the remainder of the population, including loss of spouse, friends, or family members, all of which contributes to an inclination to remain sedentary. The loss of a spouse, close friends, or relatives not only has a direct psychologic impact on person but also affects one's social support structure. These people often act as a physical activity partner and, as such, are a critical element of motivation.

Environment. The physical environment affects the inclination to remain sedentary. The weather, sunlight, space, and air quality all contribute to one's motivation to exercise. Many elders flock to warmer climates for the winter or permanently relocate to improve their physical environment as a means of improving their quality of life (QOL). One aspect of QOL implicit in this common decision-making process is physical activity.

METHODS OF MOTIVATION

To overcome the common obstacles to initiating exercise, it is incumbent on physicians to counsel their elderly patients to exercise. Interestingly, those encouraged by a physician to exercise report fewer barriers and exercise more than those without such support,⁵² underscoring the large potential benefit inherent in a physician's intervention to assist elderly patients to become more active.

Educate

Clinicians must educate elders about activity benefits and practice. It empowers elders to play a more informed, active role in their own health. Clinicians can correct misconceptions that illness and disabilities are caused by activity or necessitate inactivity. Explain, for example, to your arthritic patients evidence that strengthening programs improve knee arthritis symptoms.⁵³ Education may also empower elders, improving their mental outlook and self-efficacy. There are many educational opportunities including counseling in a clinician's office, literature at the doctor's office or local senior center, verbal instruction from a physical or occupational therapist, and fit-

ness classes at the local Young Men's Christian Association (YMCA) or senior center.

Promote Goal-Oriented, Gradual, Activity Progression

An exercise program should include gradual activity progression with achievable short-term goals. Obtainable goals enable a more pleasant, confidence-inspiring experience. Advise your elderly patients of the national recommendations to accumulate 30 to 60 minutes of moderate intensity physical activity per day.⁵⁴ Graduated physical activity programs should be coupled with long-term goals. Educate elders about the health benefits of both short- and long-term goals, whereby small increments of progress contribute to their long-term health. Specifically, counsel them on the expected functional gains from increased strength and aerobic capacity.

Address Costs

In general, the elderly overestimate the various costs of exercise. Their health care professional should give a frank estimate of the costs rather than ignore the subject. Also, some perceived costs, such as exertion or fatigue from the exercise program, may be reframed as positive outcomes, gains, or signs of success from the program. The psychologic costs of participation can be addressed through continued encouragement. The inclination to remain sedentary may be caused by lack of engaging in this appraisal at all.

Address Safety

Fear of injury is a common concern of elders. Therefore, an exercise environment and regimen must feel and be safe. Safety techniques include joint protection education,⁵⁵ gradual exercise progression, increasing duration and frequency before intensity,³ emphasis on low-impact activities like walking,⁵⁶ and adequate warm-up and cool-down periods.⁵⁷ Address patient-specific fears; this approach will help the clinician tailor an individualized and safe activity program.

Adapt Activities and Equipment

Adapted equipment and activity programs enable less able-bodied people to participate in activities they would otherwise be unable to perform. This adaptation is particularly useful for those with significant disease and disability. There are adapted activity programs for almost every disability. For example, a person with back problems may use a recumbent bicycle or swim for aerobic activity; someone with arthritic knees and hips can use an upper-extremity ergometer. Adapted activity programs help elders redefine their own abilities, enabling them to remain active despite physical disabilities and comorbid illnesses. In addition, adapted activities enable elders to improve their self-efficacy, redressing the misconception that disability equals inactivity by providing more accessible activity options.

Treat Concurrent Morbidities

Comorbid illnesses contribute to the sense of disability many elders feel. CAD, hypertension, diabetes, and obesity as well as symptoms such as pain, shortness of breath, numbness, and impaired vision all limit activity levels. Physicians should ask their patients what physical symptoms and comorbidities limit their activity levels and determine if activity is safe for the specific disease. In most cases, it is. The next step is to address the treatable symptoms. As an example, among the elderly, 1 of the most commonly undertreated symptoms is pain.⁵⁸ Those without athletic experience must learn to distinguish normal postexercise muscle aches from more serious causes of pain.

Educate elders about the treatable nature of their comorbid illnesses. In fact, sedentary behavior is a precursor to all major modifiable risk factors for cardiac disease including diabetes, CAD, hypertension, and obesity.

Facilitate Empowerment

Empowering elders profoundly effects motivation. Involve seniors in planning, selecting, and evaluating their own physical activity program. Have elders organize community exercise programs at the local gym, YMCA, or senior center. Transferring control from clinicians and others outside the senior community to within the senior community is a powerful motivating tool. Research³² shows that interventions enabling nursing home residents to increase control of their own health resulted in greater activity levels and self-reported happiness.

Use the Prescription Pad

Patients given written instructions on a prescription pad are more compliant than those given verbal instruction.⁵⁹ Furthermore, physician's advice ranks as a major motivating factor for elders to exercise.⁶⁰ The physician's prescription pad is a powerful, often underused, motivational tool. Physicians spend proportionately more time discussing medications, smoking cessation, and weight loss than exercise. It is beneficial to write physical activity program prescriptions, providing added symbolic importance to these recommendations. A month's activity program on a prescription pad motivates an elderly patient, emphasizing the health importance of the goal.

Focus on Accessibility and Affordability

Physicians should become familiar with the accessible exercise facilities and programs in their community. Put together a handout listing the local health clubs, senior centers, YMCAs, community-organized exercise programs, walking clubs, and accessible parks and malls for walking. Ask your active elderly patients where they go for exercise and incorporate their experiences into your repertoire of advice for your less-motivated patients. It is important also to recognize the relative costs of each option. Be creative in thinking of low-expense activity options. In bad weather, elders can walk the local mall or indoor high school track. Most cities and towns have affordable exercise classes (walking clubs, aerobics, strengthening, and dance classes) geared toward seniors.

Promote Socialization

Organized forms of physical activity also provide a form of socialization, a key motivating factor. People are more likely to be active if they have others to be active with and there is a social component to the physical activity. Many of the activity options described earlier (eg, senior centers, YMCAs, exercise classes, walking clubs) are social. This factor is particularly important to those who do not have a spouse or who live an isolated life, which is the case of many unmotivated seniors. Furthermore, seeing others with similar circumstances achieve improved fitness bolsters one's perceived chance of success and thereby improves motivation.

Provide Physical and Occupational Therapy

Physical and occupational therapy provides an additional motivational tool for elders. Therapists provide safe exercise instruction tailored to individual needs. They are adept at relating physical abilities to functional goals. For example, they may determine how much triceps strength training is required to stand from a seated position. Further, the routines they teach help elders develop habit-forming activities. Physical and oc-

Table 1: Interventions to Increase Motivation

Education
Physical therapy
Occupational therapy
Adapted activities and equipment
Prescription pad
Socialization
Treating concurrent morbidities
Accessible activity options
Senior exercise programs
Safety training
Gradual activity progression
Affordable activity options

cupational therapists are both affordable and accessible and are typically reimbursed in part by Medicare insurance. Therapy can be provided at outpatient clinics and with home visits.

CONCLUSIONS

Although the health benefits of physical activity for elderly persons are well established, exercise is an underused form of health promotion, especially in the elderly population. Physicians must play a more active role in motivating their patients to exercise. Clinicians historically have not actively promoted physical activity and sometimes have even actively discouraged activity. Motivation is not simply a static description of an individual's personality; rather, it is comprised of many modifiable factors. We can think of the motivational model presented earlier in terms of the motivation of health care professionals reading this article to adopt the practice of recommending exercise to their elderly patients. The perceived importance of this goal is improved through information about the benefits of exercise in the elderly. The perceived success of the physician in affecting change in the elder's exercise habits is improved through information about the efficacy of this behavior. Perceived cost is lessened through concrete, easily achievable, quick recommendations for how to influence the exercise habits of elders. Last, the inclination for health care professionals to remain sedentary, that is, not advocate for their elderly patients to exercise, is addressed: patients often perceive lack of advice from physicians to exercise as tacit support for sedentary behavior.

Elders face particular challenges in motivating to activity, including illnesses, misinformed belief systems, lack of a peer group, accessibility, financial concerns, a sense of disempowerment, and fear of injury. In tailoring individualized exercise prescriptions for our elder patients, one must take into account each patient's specific motivational limitations and address each of these issues independently. Such a methodologic and organized approach to counseling elders on physical activity will help physicians assist their elderly patients toward greater activity (table 1).

References

1. National Center for Chronic Disease Prevention and Health Promotion. Missed opportunities in preventive counseling for cardiovascular disease—United States, 1995. *MMWR Morb Mortal Wkly Rep* 1998;47:91-5.
2. Burton LC, Paglia MJ, German PS, Shapiro S, Damiano AM. The effect among older persons of a general preventive visit on three health behaviors: smoking, excessive alcohol drinking, and sedentary lifestyle. The Medicare Preventive Services Research Team. *Prev Med* 1995;24:492-7.
3. Christmas C, Andersen RA. Exercise and older patients: guidelines for the clinician. *J Am Geriatr Soc* 2000;48:318-24.

4. McMurdo ME. Prescribing exercise in general practice. Randomized controlled trials exist. *BMJ* 1994;309:872.
5. Mulley GP. Myths of ageing. *Lancet* 1997;350:1160-1.
6. O'Brien SJ, Vertinsky PA. Unfit survivors: exercise as a resource for aging women. *Gerontologist* 1991;31:347-57.
7. Maddox M. Older women and the meaning of health. *J Gerontol Nurs* 1999;25:26-33.
8. Centers for Disease Control and Prevention. Surveillance for selected public health indicators affecting older adults—United States. *MMWR Morb Mortal Wkly Rep* 1999;48(Suppl):S5-8.
9. Ash D. Exercises for older adults. In: Ash D, Werlinger CJ, editors. *Exercise for health promotion: a prescriptive approach*. Gaithersburg: Aspen; 1997. p 5-6.
10. Judge JO. Exercise programs for older persons: writing an exercise prescription. *Conn Med* 1993;57:269-75.
11. Paist SS. Screening and preventive interventions in older patients: which ones are useful? *Hosp Med* 1999;35:16-21.
12. Lee IM, Paffenbarger RS Jr. Do physical activity and physical fitness avert premature mortality? *Exerc Sport Sci Rev* 1996;24:135-71.
13. Blair SN, Kohl HW, Barlow CE, Paffenbarger RS Jr, Gibbons LW, Macera CA. Changes in physical fitness and all-cause mortality: a prospective study of healthy and unhealthy men. *JAMA* 1995;273:1093-8.
14. Leveille SG, Guralnik JM, Ferrucci L, Langlois JA. Aging successfully until death in old age: opportunities for increasing active life expectancy. *Am J Epidemiol* 1999;149:654-64.
15. Bean JF, Vora A, Frontera WR. The benefits of exercise for community-dwelling older adults. *Arch Phys Med Rehabil* 2004;85(Suppl 3):S31-42.
16. Kaplan R. Health and aging in Alameda County Study. In: Schaie KW, Blazer DG, House JS, editors. *Aging, health behaviors, and health outcomes*. Hillsdale: Lawrence Erlbaum Assoc; 1992. p 69-88.
17. Sheppard, R. Determinants of exercise in people aged 65 and older. In: Dishman R, editor. *Advances in exercise adherence*. Champaign: Human Kinetics; 1994. p 343-60.
18. NIH Consensus Development Panel on Physical Activity and Cardiovascular Health. *Physical activity and cardiovascular health*. *JAMA* 1996;276:241-6.
19. American College of Sports Medicine Position Stand. Exercise and physical activity for older adults. *Med Sci Sports Exerc* 1998;30:992-1008.
20. US Preventive Services Task Force. *Guide to clinical preventive services*. 2nd ed. Washington (DC): US Dept of Health and Human Services, Office of Disease Prevention and Health Promotion; 1996. p 611-24.
21. US Department of Health and Human Services. *Physical activity and health: a report of the Surgeon General*. Atlanta: US Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion; 1996.
22. *Merriman-Webster Collegiate Dictionary*. 10th ed. Springfield (MA): Merriman-Webster; 1999. Motivation; p 751.
23. Sallis JF, Owen N. *Physical activity and behavioral medicine*. Thousand Oaks: Sage; 1999. p 110-34.
24. Geelen RJ, Soons PH. Rehabilitation: an "everyday" model. *Patient Educ Couns* 1996;28:69-77.
25. Fogel ML, Rosillo RH. Correlation of psychological variables and progress in rehabilitation. *Dis Nerv Syst* 1969;30:593-601.
26. Tinetti ME, Powel L. Fear of falling and low self-efficacy: a cause of dependence in elderly persons. *J Gerontol* 1993;48:35-8.
27. McAuley E, Katula J, Mihalko SL, et al. Mode of physical activity and self-efficacy in older adults: a latent growth curve analysis. *J Gerontol B Psychol Sci Soc Sci* 1999;54:P283-92.
28. Simonsick ME, Guralnik JM, Fried LP. Who walks? Factors associated with walking behavior in disabled older women with and without self-reported walking difficulty. *J Am Geriatr Soc* 1999;47:672-80.
29. Conn VS. Older adults and exercise: path analysis of self-efficacy related constructs. *Nurs Res* 1998;47:180-9.

30. Rodin J, Timko C. Sense of control, aging, and health. In: Ory MG, Abeles RP, Lipman PO, editors. *Aging, health, and behavior*. Newbury Park: Sage; 1992. p 174-206.
31. Kinion ES, Christie N, Vellella AM. Promoting activity in the elderly through interdisciplinary linkages. *Nursing connections* 1993;6(3):19-26.
32. Rodin J. Aging and health: effects of the sense of control. *Science* 1986;233:1271-6.
33. Fried LP, Guralnik JM. Disability in older adults: evidence regarding significance, etiology, and risk. *J Am Geriatr Soc* 1997; 45:92-100.
34. Schuster C, Petosa R, Petosa S. Using social cognitive theory to explain exercise. *J Health Educ* 1995;26:14-21.
35. Scharff DP, Homan S, Kreuter M, Brennan L. Factors associated with physical activity in women across the lifespan: implications for program development. *Women Health* 1999;29:115-34.
36. Public health. . . senior citizens are turning to exercise faster than any other adult group. *Hosp Health Netw* 1996;70:14.
37. Melillo KD, Futrell M, Williamson E, et al. Perceptions of physical fitness and exercise activity among older adults. *J Adv Nurs* 1996;23:542-7.
38. Clark DO. Physical activity and its correlates among urban primary care patients aged 55 years and older. *J Gerontol B Psychol Sci Soc Sci* 1999;54:S41-8.
39. Stephens T, Craig C. *The well-being of Canadians: highlights of the 1988 Campbell's Survey*. Ottawa (ON): Canadian Fitness and Lifestyle Research Institute; 1990.
40. Barzagan M. The effects of health, environmental, and psychological variables on fear of crime and its consequences among urban black elderly individuals. *Int J Aging Hum Dev* 1994;38: 99-115.
41. Benson S. The older adult and fear of crime. *J Gerontol Nurs* 1997;23:25-31.
42. Fitzgerald J, Singleton S, Neale A, Prasad A, Hess J. Activity levels, fitness status, exercise knowledge, and exercise beliefs among healthy, older African American and white women. *J Aging Health* 1994;6:296-313.
43. Gillett PA, Johnson M, Juretech M, Richardson N, Slagle L, Farikoff K. The nurse as exercise leader. *Geriatr Nurs* 1993;14: 133-7.
44. Howland J, Peterson EW, Levin WC, Fried L, Pordon D, Bak S. Fear of falling among the community-dwelling elderly. *J Aging Health* 1993;5:229-43.
45. Kauffman KS. Center as haven: findings of an urban ethnography. *Nurs Res* 1995;44:231-6.
46. Morey MC, Cowper PA, Feussner JR, DiPasquale RC, Crowley GM, Sullivan RJ Jr. Two-year trends in physical performance following supervised exercise among community-dwelling older veterans. *J Am Geriatr Soc* 1991;39:549-54.
47. O'Neill K, Reid G. Perceived barriers to physical activity by older adults. *Can J Public Health* 1991;82:392-6.
48. Peterson E, Howland J. An evidence-based intervention to reduce fear of falling. *Health Care Rev* 2000;1:5.
49. Young A, Dinan S. ABC of sports medicine: fitness for older people. *BMJ* 1994;309:331-4.
50. Schaie KW, Blazer DG, House JS, editors. *Aging, health behaviors, and health outcomes*. Hillsdale: Lawrence Erlbaum Assoc; 1992. p 72-3, 78-85.
51. Hurd LC. "We're not old!": older women's negotiation of aging and oldness. *J Aging Stud* 1999;13:419-39.
52. Sommers J, Andre F, Price H. Perceptions of exercise of mall walkers utilizing the health belief model. *J Health Educ* 1995;26: 158-66.
53. Fiatarone-Singh M. Exercise comes of age: rationale and recommendations for a geriatric exercise prescription. *J Gerontol Biol Sci Med Sci* 2002;57:262-82.
54. Pate RR, Pratt M, Blair SN, et al. Physical activity and public health. A recommendation from the Centers for Disease Control and Prevention and the American College of Sports Medicine. *JAMA* 1995;273:402-7.
55. Maher AB, Salmond SW, Pellino TA. *Orthopaedic nursing*. Philadelphia: WB Saunders; 1994. p 384.
56. Pollock M, Carroll JF, Graves JE, et al. Injuries and adherence to walk/jog and resistance training programs in the elderly. *Med Sci Sports Exerc* 1991;23:1194-200.
57. Nayak N, Randall K, Shankar K. Exercise in the elderly. In: Shankar K, editor. *Exercise prescription*. Philadelphia: Hanley & Belfus; 1999. p 333-4.
58. Ferrell BA. Pain management. *Clin Geriatr Med* 2000;16:853-74.
59. Swinburn BA, Walter LG, Arroll B, Tilyard MW, Russell DG. The green prescription study: a randomized controlled trial of written exercise advice provided by general practitioners. *Am J Public Health* 1998;88:288-91.
60. Thomas RJ, Kottke TE, Brekke MJ, et al. Attempts at changing dietary and exercise habits to reduce risk for cardiovascular disease: who's doing what in the community? *Prev Cardiol* 2002;5: 102-8.