State of the Art in Geriatric Rehabilitation. Part I: Review of Frailty and Comprehensive Geriatric Assessment

Jennie L. Wells, MD, Jamie A. Seabrook, MA, Paul Stolee, PhD, Michael J. Borrie, MB, ChB, Frank Knoefel, MD


Objectives: To increase recognition of geriatric rehabilitation and to provide recommendations for practice and future research.

Data Sources: A CINAHL and 2 MEDLINE searches were conducted for 1980 to 2001. A fourth search used the Cochrane database.

Study Selection: One author reviewed the reference for relevance and another for quality. A total of 336 articles were selected. Excluded articles were unrelated to geriatric rehabilitation or were anecdotal or descriptive reports.

Data Extraction: The following major geriatric rehabilitation subtopics were identified: frailty, comprehensive geriatric assessment, admission screening, assessment tools, interdisciplinary teams, hip fracture, stroke, nutrition, dementia, and depression. Part I describes the first 5 subtopics on concepts and processes in geriatric rehabilitation. Part II focuses on the latter 5 subtopics of common clinical problems in frail older persons. A level-of-evidence framework was used to review the literature. Level 1 evidence was a randomized controlled trial (RCT) or a meta-analysis or systematic review of RCTs. Level 2 evidence included controlled trials without randomization, cohort, or case-control studies. Level 3 evidence involved consensus statements from experts or descriptive studies.

Data Synthesis: Of the 336 articles evaluated, 108 were level 1, 39 were level 2, and 189 were level 3. Recommendations were made for each subtopic. In cases in which several articles were written on the same topic and drew similar conclusions, the authors chose those articles with the strongest level of evidence, reducing the total number of references.

Conclusions: Frail elderly patients should be screened for rehabilitation potential. Standardized tools are recommended to aid diagnosis, assessment, and outcome measurement. The team approach to geriatric rehabilitation should be interdisciplinary and use a comprehensive geriatric assessment. Medication reviews and self-medication programs may be beneficial. Future research should address cost effectiveness, consensus on outcome measures, which components of geriatric rehabilitation are most effective, screening, and what outcomes are sustainable.

Key Words: Comorbidity; Frail elderly; Geriatrics; Rehabilitation; Review literature [publication type].

Geriatric rehabilitation is an important emerging field in rehabilitation. It has been defined as "evaluation, diagnostic, and therapeutic interventions whose purpose is to restore functional ability or enhance residual functional capability in elderly people with disabling impairments." With growing numbers of frail older persons, there is an increasing need for appropriate geriatric rehabilitation services. Despite this growing need, the practices and outcomes of this field are not well described.

Several factors in the rehabilitation of older persons distinguish it from the rehabilitation of younger adults. The most salient difference is the higher burden of comorbid disease. Disability among seniors is often multicausal, requiring input from several subspecialties and professional disciplines to investigate and manage the medical issues and rehabilitation needs.

Two review articles on geriatric rehabilitation were published in 1997 and 1999. The 1997 article by Hoenig et al established the conceptual framework for evaluating and treating disability in the elderly. Løkk's 1999 article gives an overview of clinical practice in geriatric rehabilitation. Both articles suggest that more research is needed in geriatric rehabilitation to address best practices, as well as consensus on interventions and outcome measures. The 2 articles acknowledge that geriatric rehabilitation is an evolving field that is responding to changing demographics, financial pressures, and local health care policies.

This article (part I) reviews the concept of frailty and comprehensive geriatric assessment (CGA), because they are an integral part of understanding the role of geriatric rehabilitation, and reviews the main processes of care in geriatric rehabilitation. The specific sections are frailty, CGA, admission screening, assessment tools, and interdisciplinary teams. Herein we offer recommendations for best care practices in geriatric rehabilitation supported by evidence from the literature. Part II reviews key clinical diagnoses relevant to geriatric rehabilitation and provide evidence-based recommendations for care.

Methods

A comprehensive review of the geriatric rehabilitation literature for 1980 to 2001 was completed. The first 2 search strategies were completed on MEDLINE, the third searched CINAHL, and the fourth the Cochrane database. The first search, limited to English and French languages, used the following key words: geriatric, elderly, frail, geriatric reha-
bilitation, rehabilitation, inpatient and outpatient geriatric rehabilitation, outcomes, outcome measures, long-term care, home care, community, and geriatric day hospitals. The second MEDLINE and CINAHL searched limits to randomized controlled trials (RCTs), age over 65 years, and used no language exclusion. The key words were geriatric rehabilitation. These searches generated 3206 references. Of these, 330 were relevant. One author reviewed the references for relevancy and another assigned level of evidence. The CINAHL and Cochrane searches were completed by a librarian search expert. The Cochrane library search used the following the US National Library of Medicine’s permuted medical subject heading terms: geriatrics, assessment, rehabilitation, elderly, and aged. A total of 6 additional articles were extracted. Therefore, a total of 336 articles were considered in our review.

Articles were excluded for the following reasons: they were unrelated to geriatric rehabilitation or were anecdotal or descriptive reports on a small number of patients. We focused on inpatient geriatric rehabilitation because the majority of publications dealt with this setting. Additionally, because the literature on day hospitals has been recently systematically reviewed,4 geriatric day hospital was excluded as a specific subtopic of interest.

A level of evidence was assigned for the articles identified in the search. The standardized levels of evidence were the same as those used in a recent Canadian consensus conference on dementia1,2:

- Level 1: evidence from at least 1 RCT.
- Level 2: evidence from well-designed controlled trials without randomization or from well-designed cohort or case-control analytic studies.
- Level 3: evidence supported by consensus statements from experts, opinions from respected authorities, descriptive studies, or reports of expert committees.

When a study was a systematic review or meta-analysis it was assigned a level 1.

Of the 336 articles evaluated, 108 were level 1, 39 were level 2, and 189 were level 3 evidence. Recommendations were made according to the level of evidence on the specific area. Where there were several articles with similar conclusions on a topic, we chose the articles with the strongest level of evidence, thereby reducing the total number of references. To describe assessment tools, we also referenced additional sources.

The clinical themes presented in this review (parts I, II) were defined by the number and quality of articles published. We agreed by consensus on the subtopic selection. The following areas were selected: frailty, CGA, admission screening, assessment tools, interdisciplinary teams, hip fracture, stroke, nutrition, dementia, and depression. The topics were organized to represent the clinical processes of geriatric rehabilitation from preadmission assessment to clinical management. Part I of this literature review addresses common concepts and processes in geriatric rehabilitative care by describing the first 5 subtopics. Part II highlights patient care of common clinical problems for frail older persons by addressing the remaining 5 subtopics.

Frailty

Frailty is the clinical state that makes the medical management and rehabilitation of the elderly complex. The definition of frailty has evolved over the years from a description of dependence on others to a more dynamic model that encompasses the biomedical and psychosocial aspects of frailty.3,4 Frailty can be viewed as a multidimensional construct that encompasses more than just simple dependence for activities of daily living (ADLs). It is a complex interplay of a person’s assets and deficits, including health and illness, attitudes, practices, resources, and dependence on others.4,15

Frailty is also seen as the loss of functional homeostasis. Functional homeostasis is the ability of an individual to withstand illness without loss of function.16,17 Carlson et al14 found that older patients with poor functional homeostasis declined in functional status and had higher adverse outcomes and readmission to hospital. The assessment of functional homeostasis may provide a method to identify frail individuals for more intensive management strategies including rehabilitation.

The work of Fried et al18 on conceptual models of illness presentation provides some of the theoretical background for the evaluation of frail older persons. Disease presentation in the elderly is atypical, and older persons often underreport symptoms and problems. In Fried’s study,19 the traditional medical model of illness presentation was found to fit less than 50% of seniors presenting for geriatric outpatient assessment. For this reason, models that acknowledge the cumulative burden of multiple problems, as well as environmental, psychosocial, caregiver, and functional issues are important in assessing and caring for the elderly. The work of Redelmeier et al19 supports this model by showing that when a person with chronic illnesses is treated in a disease-specific model of care, unrelated diseases are more likely to be left untreated.

Persons with multiple medical problems face a greater decrement in function than those with only a single problem. Concomitant cardiac, pulmonary, gastrointestinal, renal, musculoskeletal, and neurologic problems coupled with muscle deconditioning with all contribute to a person’s decline in function. The higher prevalence of cognitive impairment in older patients adds to comorbidity.24,25 Geriatric syndromes such as falls, delirium, and incontinence are functional problems and are considered markers of frailty.14 Geriatric assessment and rehabilitation acknowledge the heterogeneity of the frail older population and encompass the concept of prevention, management, and rehabilitation of all aspects of frailty, not just the treatment of medical illnesses in the acute setting.

CGA and Rehabilitation

In North America, the development of geriatric rehabilitation units (GRUs) was catalyzed by the landmark 1984 article by Rubenstein et al22 which describes the effectiveness of geriatric inpatient units. This research was the first RCT in North America to show that CGA can result in meaningful improvements in the function of frail elderly persons in the inpatient geriatric assessment unit (GAU) setting. Because much of the evidence supporting CGA and rehabilitation stems from the evaluation of GAUs, an understanding of the concept of CGA and the overlap of functions of GAUs and GRUs are important in the discussion of geriatric rehabilitation.

A CGA involves a multidimensional team approach that determines an older person’s biomedical, psychosocial, and environmental needs so that an appropriate treatment and follow-up plan can be initiated. It has been shown in the inpatient setting to improve cognition, to improve functional status, to prevent placement in a nursing home, to reduce readmissions to hospital, and to lower mortality.23-26 The meta-analysis by Stuck et al23 for inpatient geriatric care included 6 RCTs (n=504, geriatric care; n=586, usual care). This research also shows that, for both inpatients and outpatients (total 28 RCTs, 4959 CGA patients, 4912 control), CGA associated with long-term management is effective in improving survival and function.23

The results of cost effectiveness of geriatric evaluation and care are mixed. The Miller27 analysis of the 1990 RCT trial by
Applegate et al.26 (n = 78 geriatric care; n = 77 usual care) showed that the improved outcomes in the geriatric group were not associated with decreased cost of later medical service after 1 year of follow-up.27 In 1995, Rubenstein et al.28 demonstrated reduced costs for institutional care, fewer hospital readmissions, higher morale and functional status, and lower mortality and nursing home placement in an RCT of geriatric assessment patients compared with usual care (treatment group n = 63; control group n = 60). The cost of care in a geriatric unit was shown to be no different than standard care over 3 years and care in the geriatric unit resulted in lower mortality without compromise of quality of life. More recently, in the outpatient setting, Trentini et al.29 showed that frail elderly patients randomized to CGA (n = 79) had improved mental status, morale, and function, and reduced hospital and nursing home admission. CGA patients received more homecare and outpatient service than usual care patients (n = 73), resulting in equivalent total health care expenditure.

GAUs and GRUs have many similarities. Both provide rehabilitation with an interdisciplinary team trained in the care of the elderly, with attention to medical, psychosocial, and functional issues. Treatment plans are established and reviewed in regular team meetings with therapeutic and rehabilitative goals.30 In a GAU, there is more emphasis on medical treatment and evaluation. Rehabilitation goals on the GAU are usually short term. On a GRU, there is a greater emphasis on rehabilitation and achieving maximal function.

Functional decline in frail elderly persons is associated with gait and balance disorders, depression, unsafe home environments, coronary artery disease, hypertension, and incontinence.31 Specialized GAUs and GRUs are designed to approach the medical evaluation of the frail elderly from an interdisciplinary perspective. In geriatric rehabilitation, small gains in several areas may result in improved functional status. Attention is given to medical illnesses, as well as to the preservation and restoration of functional status.

While in rehabilitation, frail older persons often have active medical problems and comorbidities that require close medical management. Patrick et al.32 reported that 66% of GRU patients had 6 or more coexisting illnesses. Felsenthal et al.33 documented in a rehabilitation setting that 3.7 medical interventions were required per patient (N = 82; avg age, 74y; avg length of stay [LOS], 28d). Wilkinson et al.34 reported that of 200 patients in a GRU (age range, 60–98y; mean, 80.5y; mean LOS, 28d), 86% required medical intervention. Forty-nine percent had their rehabilitation course complicated by medical illnesses.

The CGA approach to geriatric rehabilitation assesses the contribution of multiple medical problems and has been shown to uncover new diagnoses that were previously unrecognized and untreated.35,36 Despite the multifactorial nature of disability and the burden of comorbidity, geriatric rehabilitation has improved the health and function of many frail older persons.22–25 In a review on current models of geriatric care for 1984 to 1998, concluded that inpatient geriatric units providing rehabilitation for selected older patients offer proven benefits and should be available in all general hospitals.

The literature supports the following for frail older persons receiving rehabilitation: (1) CGA is important for frail older persons with rehabilitation needs (level 1),22–24 and (2) because many patients in geriatric rehabilitation have intercurrent illnesses and comorbidities, close medical supervision and concomitant treatment is important (level 3).33

Screening for Admission

Although careful patient targeting has been advocated as a method of improving the outcomes of services for older persons, variations in targeting practices have lead to inconsistent results in studies of geriatric rehabilitation.23,41 When selecting patients for geriatric rehabilitation, the dimensions used to define frailty should be assessed: functional impairment, medical complexity, psychologic functioning, and social support.42 Selecting appropriate patients for inpatient geriatric rehabilitation involves identifying individuals with complex problems but who may potentially benefit from rehabilitation. This means excluding patients who are too medically unstable or who are more appropriate for palliative care and those who can remain at home and be treated as outpatients.27,41 In the past, CGA consensus conferences have supported targeting. Rubenstein et al.44 describe the categorization of patients into diagnostic and prognostic groups to target the most appropriate patients for specialized geriatric inpatient care. Patients over age 65 were classified into 5 categories: (1) geriatric evaluation unit candidate—having “medical, functional, or psychosocial problem[s] interfering with discharge home, and not included in the other four categories”; (2) severely demented; (3) medical—patients with a single medical disease; (4) terminal (or palliative); and (5) independent.44 Targeting patients for geriatric evaluation in inpatient units may improve cost effectiveness.41 Wieland et al.45 and Stuck et al.23 in separate meta-analyses, defined targeting by whether the trials excluded “too healthy” subjects or “subjects with poor prognosis.” Studies that used targeting were more likely to show improved outcomes.45

A medical assessment is an important component of premission screening. A cohort study of 507 acutely hospitalized male veterans aged 65 years and over showed that patients with greater numbers of targeting criteria at admission (eg, polypharmacy, confusion, falls) were more likely to have poor outcomes, including nursing home placement, longer hospital stays, and mortality at 12 months.46 For this reason, we think that targeting acutely ill, geriatric inpatients with potential remedial geriatric syndromes (polypharmacy, confusion, falls) for geriatric services may prevent adverse outcomes.46

On the other hand, in a recent study42 of 110 GRU patients, poorer rehabilitation outcomes suggested that there may be a threshold of severe comorbidity above which poorer rehabilitation outcome may be expected. This recent research suggests that patients with a single medical disease, less intercurrent illness, and not included in the other four categories are more appropriate for targeted rehabilitation.42

Aside from medical conditions, patient motivation is sometimes used in assessing potential for rehabilitation success. According to Mosqueda,42 patients with low motivation to participate in geriatric rehabilitation have lower rehabilitation potential than do patients with high motivation. Depression can influence a patient’s motivation level. Depressed patients may be less motivated to participate in therapy, which, in turn, may delay discharge. Treating depression, however, should improve motivation and outcomes.47 Low motivation to participate in rehabilitation should not necessarily be grounds for exclusion. It is possible, for example, that a patient may be perceived as “poorly motivated” if the goals set by the interdisciplinary team are not patient-focused. When this occurs, blame is transferred to the patient when he/she does not make substantial functional improvement.48

Motivation to participate in rehabilitation may be fostered. In 1 study49 of 77 elderly inpatients on a GRU, 37 participants were randomly assigned to a treatment group (40 to a control group of usual geriatric rehabilitative care) of interventions consisting of verbal persuasion, role modeling, and physiologic feedback. Motivation was assessed by 4 measures of self-efficacy and a participation index. Outcome measures included a functional measure and 2 pain measures. The treatment group
experienced less pain, had greater participation and efficacy beliefs related to participation, and had improved functional performance compared with the control group at discharge.49

Cognitive screening is also important in assessing rehabilitation potential.50 Inability to understand instructions or remember information may hinder therapy. Nonetheless, recent studies51-54 suggest that some cognitively impaired patients may benefit from geriatric rehabilitation. One longitudinal study52 of patients with hip fracture found that although cognitively intact patients had higher levels of mobility at discharge, both cognitively impaired and intact patients improved similarly in sphincter control, locomotion, self-care, and motor function. Thus, some cognitively impaired geriatric patients should be considered for rehabilitation. One of the challenges of future research will be to determine the degree of comorbidity and cognitive impairment that is compatible with successful outcomes in geriatric rehabilitation.

Based on the literature evidence, suggestions are (1) patients should have preadmission screening for rehabilitation potential before admission to a GRU (level 3),32,41,42,50 and (2) the screening process should be used to establish well-defined, patient-focused goals for rehabilitation (level 3).41,42,48

Assessment Tools

The use of assessment tools is not unique to geriatric rehabilitation. The need for standardized assessment tools in geriatric assessment and rehabilitation stems from the development of the CGA and the assessment of objective components of frailty. This section describes the most commonly used tools in the context of CGA and geriatric rehabilitation reported in the literature.

Physicians often underestimate the extent of disability that a patient has in basic ADLs. Further, physician recording of the level of function in medical notes is poor.55 Impairment in physical function, mental status, continence, emotional status, vision, and gait are notable examples that can be underdocumented. By using standardized assessment tools, a CGA can objectively document physical, cognitive, emotional, and functional conditions.56-58

Assessment and reassessment of a patient’s individual functional problems monitor improvement during rehabilitation. The Barthel Index and the FIM™ instrument are commonly used functional measures. The Modified Barthel Index comprises 10 items focusing on ADLs and has a maximum score of 20. This test was developed for people with neurologic or musculoskeletal disabilities to assess performance before admission and after discharge from a rehabilitation program. The Barthel Index is easy to administer; scores correlate well with LOS; it also has high intra- and interrater reliability. It is not particularly responsive to change, however, and falls short in sensitivity in the higher and lower ranges.56

In recent years, the FIM instrument has replaced the Barthel Index in many rehabilitation centers.57 The FIM is based on the Barthel Index and is a valid, sensitive measure of functional status in the elderly. It rates 18 functional activities on scales of relative independence from 1 to 7. There are 6 domains including self-care, sphincter control, mobility, locomotion, communication, and social cognition.12

In the geriatric population, there are often multiple goals based on the individual patient’s complex medical, social, and functional problems. One approach to address the complex and individualized nature of these problems for geriatric patients is the use of an individualized measure such as goal attainment scaling (GAS). GAS addresses complexity by identifying and scaling disparate, individualized goals for each patient.13 Although GAS was developed in the 1960s for use in human service and mental health programs, it has only more recently been applied in the geriatric rehabilitation setting.59 It has been shown to be valid, reliable, responsive to change, and practical to use in a variety of settings in the care of the elderly.59-61 In geriatric rehabilitation, an interrater reliability of .93 has been reported. GAS is more responsive to change than other standardized measures, such as the Barthel Index, Nottingham Health Profile, and Mini-Mental State Examination60 (MMSE).

ADLs and instrumental activities of daily living (IADLs) are carefully documented in a CGA and in the geriatric rehabilitation setting. The Katz ADL scale is widely used. It has the advantage that it can be completed by the patient or caregiver. It is brief, reliable, and valid, but it is not very sensitive to change.62 The Lawton-Brody assessment is a scale for self-care ADL and IADL.63 It has proven to be valid and reliable in the older population.7

Tests of specific function are also commonly used in CGA and the geriatric rehabilitation setting. Assessment of gait and balance is 1 example. The timed up and go (TUG) test involves timing a patient as he/she rises from a chair, walks 10ft, turns around, walks back to the chair and sits down. The TUG test has been shown to be reliable, valid, easy to administer, and it correlates well with tests such as the Berg Balance Scale (BBS) and Barthel Index. It also predicts a patient’s ability to walk safely alone outside.66 The BBS is a well-known tool for assessing balance that has been developed and validated for use in the elderly population.67 It consists of 14 common movements required for balance and mobility in everyday life. The items are graded on a scale of 0 to 4, giving a total of 56 points, with higher scores representing better performance. The test is simple to administer, safe to perform, and takes about 15 minutes. Intra- and interrater reliability are high.67

A cognitive assessment is an essential part of a CGA. Luxenberg and Feigenbaum68 have noted that, in nongeriatric inpatient rehabilitation settings, physicians tend to be unaware of the cognitive problems of their patients unless cognitive impairment was documented before admission. They suggest that cognitive testing be administered routinely for patients in a rehabilitation ward.68

The best-known measure of cognition is the Folstein MMSE.6 It has been extensively validated, is easy to administer, and has been standardized by Molloy et al.7 The clock drawing test is a valid, quick cognitive test of executive function and spatial orientation that correlates well with general cognitive ability and rehabilitation outcome.50

Several assessment tools are commonly used to assess symptoms of depression. The Geriatric Depression Scale (GDS) is a 15-point questionnaire that requires only a few minutes to administer and can be completed by the patient. It has proven to be valid and reliable in the cognitively intact elderly.10 The Even Briefer Assessment Scale for Depression (EBAS-DEP) is also valid, reliable, and easy to use in the elderly.59 Both are commonly used in geriatric assessment settings. Seniors with dementia usually lack the insight to provide reliable responses to the GDS and EBAS-DEP. The Cornell Scale for Depression in Dementia is more appropriate to assess depressive symptoms in those with cognitive impairment. The Cornell scale has been validated with both cognitively intact and impaired patients. It is also easy to administer and makes use of both patient assessment and caregiver reports.70,71

One measure that has been designed specifically to assess medical comorbidities and complexity is the Cumulative Illness Rating Scale72 (CIRS). The CIRS measures 13 bodily systems to give a comorbidity index and total cumulative illness rating score.11 This tool has been validated as a measure of medical complexity for frail older persons.72 The comorbidity...
ity index, in conjunction with other indices of function (eg, FIM or Barthel Index), can capture a patient’s level of frailty. There are numerous tools used to assess various conditions in the elderly. The assessment tools and outcome measures presented here are those most widely used in CGA in the clinical setting of inpatient geriatric rehabilitation. VanSwear- ingen and Brach have outlined the use of various measures used in CGA with community-dwelling elderly. Agreement on which tools should be used consistently would help facilitate multicenter trials and the development of benchmarks in geriatric rehabilitation.

Based on the evidence, the following is suggested: assessment tools should be used to aid in diagnosis and to measure outcome of rehabilitation (level 3).8,59,60,62,73

Team Approach to Care

Team care is not new in the medical setting.74 Most literature supports an interdisciplinary team approach to geriatric rehabilitation.3,22,26,28,30,76,77 This team usually consists of a physician, nurse, social worker, occupational therapist, physiotherapist, speech therapist, and psychologist.3,74 The interdisciplinary approach is characterized by joint decision making and responsibility with open communication, cooperation, and respect for each team members’ expertise with negotiation of roles and tasks to accomplish mutually defined goals.74 A purely multidisciplinary approach merely implies that there are multiple disciplines working on the care of a patient,79 with leadership tending to be vested in the discipline with the highest status.74

Covinsky et al78 note the successes of nurses as members of the geriatric rehabilitation team. Nurses often spend significantly more time with a patient than other team members and they can more directly assess a patient’s functional progress and psychosocial needs. Nurses in geriatric rehabilitation can also prevent muscle deconditioning by encouraging the patient to strive for independence in activities.38 In 1 study79 of 251 inpatient geriatric rehabilitation patients, nursing interventions aimed at bladder retraining and self-administration of medication were found to decrease urinary incontinence and retention and to improve knowledge of medications. Other evidence78 suggests that the empowerment of patients by nurses is essential in clinical management, and contributes to decreased hospital costs, LOS, and improved short-term functional outcomes.

An additional team member that is of particular importance in the assessment of the frail elderly is the pharmacist. A medication review by the team physician and pharmacist is considered a standard component of a CGA. Its role is to reduce drug interactions and complications in frail older persons.80 Recommendations from a pharmacist have been shown to help with discharge planning, to reduce the total number of medications, and to reduce readmission to hospital because of medication complications.81 A self-medication program assesses the patient’s ability to manage medications independently. It involves a coordinated approach with input from both nurse and pharmacist. Self-medication programs in the geriatric rehabilitation setting have been shown to improve morale, independence, patient knowledge about their complex medication regimens,82 and compliance.83

The primary goal of teamwork is to maximize the patient’s functional independence. In an RCT77 comparing the effectiveness of a team-oriented geriatric assessment and evaluation to traditional care by an internist, patients receiving the team approach had significantly fewer hospital days and annual hospital costs per patient after 1 year. Another controlled trial44 comparing 205 older patients receiving geriatric team care in an outpatient geriatric clinic versus a general medical clinic found that the geriatric patients had significantly less decline in functional health on the total Sickness Impact Profile and its physical dimension.

In addition to assessment and treatment, geriatric teams are also involved in the process of early discharge planning. Discharge planning should involve collaboration between the interdisciplinary team, patient, and family members.85 Bull and Roberts86 conducted semistructured interviews from 2 wards on a 78-bed geriatric rehabilitation hospital. Participants consistently noted the importance of geriatric teams and continuous communication as components of “proper discharge.” The role of the team approach in geriatric rehabilitation discharge planning is generalized from other similar settings. In stroke patients, for example, early hospital discharge combined with home-based rehabilitation has been shown to be as effective as usual care.87-89 Brymer et al89 found that team-coordinated geriatric discharge planning services decreased the percentage of beds for patients awaiting long-term care and increased the percentage of patients returning to community living.

Discharge planning may involve a home visit(s) from a member of the interdisciplinary team. In an RCT89 of 530 older persons recruited from selected hospital wards, those patients receiving a home visit by an occupational therapist to assess environmental hazards and to make necessary home modifications were less likely to fall than the control group at 1-year follow-up. This intervention reduced the number of falls in patients who had a history of falls.

Interdisciplinary teams have been shown to improve functional outcomes, and they also appear to increase patient satisfaction with care. In an RCT89 frail older patients assigned to outpatient geriatric assessment and management were compared with patients receiving usual outpatient primary care. The patients receiving geriatric team assessment and management reported higher satisfaction with geriatric services.

The evidence from the literature supports the following: (1) geriatric rehabilitation should have an interdisciplinary team approach (level 1),22,26,30,77,84 (2) medical care and rehabilitation should be managed by a physician and team trained in care of the elderly (level 1),22-25 (3) the rehabilitation team physician and pharmacist should complete a medication review (level 1), and (4) patients should have complex medication regimens who are returning to community living may benefit from a self-medication program (level 1).83

CONCLUSION

Geriatric rehabilitation will be an increasingly important part of health care provision for the frail older population in the coming years. Because of the high utilization of health care resources by older persons, more appropriate use of rehabilitation resources could have important cost implications.

One criticism of CGA is the resource intensity and the cost of care, particularly in the inpatient setting.22 Because the field of geriatric rehabilitation is new, there are limited studies on cost effectiveness. Rubenstein et al82 were the first to document the cost effectiveness of inpatient CGA. Rubenstein’s study showed that survival and functional status were improved in the treatment group and that per capita costs did not differ significantly from usual care, both before and after survival adjustment.

Aside from inpatient rehabilitation units, rehabilitation and assessment of the frail elderly with rehabilitation needs may occur in other settings. Patients requiring CGA have been evaluated in their homes. Recently it has been shown in a meta-analysis86 of 18 RCTs of 13,447 patients that preventive home visitation programs with a multidimensional assessment
and follow-up can reduce nursing home placement, functional decline, and mortality. Geriatric day hospitals have shown benefits in mortality and functional status and may offer cost benefits if the reduction in long-term care placement is considered. In the United States, rehabilitation services are offered for the elderly in skilled nursing facilities. Von Sternberg et al. for example, describes a managed care model of subacute geriatric rehabilitation in nursing homes to facilitate early discharge from hospital. Care under this model resulted in fewer costs than in usual care settings.

Based on our review, we recommend that older patients be screened for inpatient rehabilitation potential and that standardized assessment tools be used to aid in diagnosis, assessment, and outcome measurement. The team approach for geriatric rehabilitation should be interdisciplinary and should involve a CGA. The use of self-medication programs and a medication review is supported. Medical care and rehabilitation of frail older patients should be managed by a physician and team trained in the care of the elderly.

One limitation of this review is that some of the recommendations are derived from level 3 evidence. More research about CGA, frailty, and disablement may help establish which components of geriatric assessment and management of rehabilitation patients are critical. More research is needed in the area of screening and frailty to better identify which older patients will benefit most from CGA and geriatric rehabilitation. Additionally, research is needed to help define which settings are most appropriate and cost effective.

Similarly, research in outcomes in geriatric rehabilitation is strongly encouraged to help define which benefits are achieved and sustained. There are many commonly used tools in geriatric rehabilitation. GAS and the CIRS look promising as measures that can address the complexity of geriatric rehabilitation. Consensus on assessment and outcome tools would facilitate multicenter comparative studies. One method of achieving these research goals would be through a consensus conference. Such a conference could also be used to develop an agenda for research in geriatric rehabilitation. With continued research and an increased societal demand for geriatric services, geriatric rehabilitation will continue to become better recognized and defined for the benefits it can afford to older patients.

Acknowledgment: We thank Karen Cory for assistance with the literature searches.

References
43. Man-Son-Hing M, Power M, Byszewske A, Dalziel WB. Referral to specialized geriatric services. Which elderly people living in the community are likely to benefit? Can Fam Physian 1997;43:925-30.