

Review

Rehabilitation of the Elderly in Primary Healthcare

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Abstract: Rehabilitation is a fundamental pillar of universal health coverage, alongside health promotion, disease prevention, treatment, and palliative care. As a crucial health indicator following mortality and morbidity, functional optimization is a key outcome of rehabilitation. Traditionally associated with tertiary healthcare facilities due to its complex and multidimensional nature, various models have been proposed to integrate rehabilitation seamlessly into primary healthcare services. The primary goal of rehabilitation is to enhance, maintain, and, when possible, improve an individual's functional capacity. This review explores key aspects of elderly patient assessments conducted by family physicians to recommend appropriate rehabilitation programs. Additionally, it highlights the components of integrated preventive consultations for older adults and suggests tailored approaches based on evaluation outcomes. Collaboration between family physicians and medical rehabilitation specialists is essential for the prevention and treatment of elderly patients. A holistic, patient-centered approach ensures comprehensive care, promoting physical independence, mental well-being, and an improved quality of life.

Keywords: elderly, rehabilitation, integrative preventive care, family medicine

1. Introduction

Given that it's estimated that at least one-third of the global population will require rehabilitation during the course of illness or injury, enhancing rehabilitation to encompass early identification of health needs and prompt referral becomes crucial. This approach mitigates the impact of disabling effects and optimizes overall function. The integration of rehabilitation services and the introduction of innovative delivery models benefit all levels of care, whether in urban or remote areas. The World Health Organization's Rehabilitation 2030 initiative actively advocates for strategies reinforcing rehabilitation to meet the evolving health needs of the aging global population, marked by an increased incidence of both new and chronic impairments[1]. The role of primary healthcare is recognized in a document called the "Astana Declaration," which was launched during the "Global Conference on Primary Health Care," an event that took place in Astana, Kazakhstan, in 2018. Considering the global demographic and epidemiological trends, there is a belief that a change is necessary

regarding short-term, medium-term, and long-term strategies in health systems, specifically an integration of primary healthcare and medical rehabilitation into a unified concept, in order to achieve effective coordination of patient care [2]. As explored in the subsequent sections, the aging process is characterized by a range of mechanisms that can adversely affect an individual's functionality and overall quality of life.

The aging process typically means a decline in individual physiological reserves, and over time, so-called "geriatric syndromes" may appear, which need to be recognized, prevented, and treated. The role of the family doctor is essential in this context, as they are the gateway to medical rehabilitation when necessary and as long as the patient's condition allows [3]. This review explores key aspects of elderly patient assessments conducted by family physicians in order to recommend appropriate recovery programs. Additionally, this review highlights the components of integrated preventive consultations for older adults and suggests tailored approaches based on evaluation outcomes. Integrative preventive care in family medicine contains assessing risk factors and screening for frailty, sarcopenia, sensory deficits, cognitive decline and dementia, fall risk, osteoporosis and cardiovascular diseases (Figure1). The intervention of the family doctor is personalized, providing education and support, and an assessment of the risks linked to polypharmacy. The integrated preventive care for older adults is conducted annually or as needed.

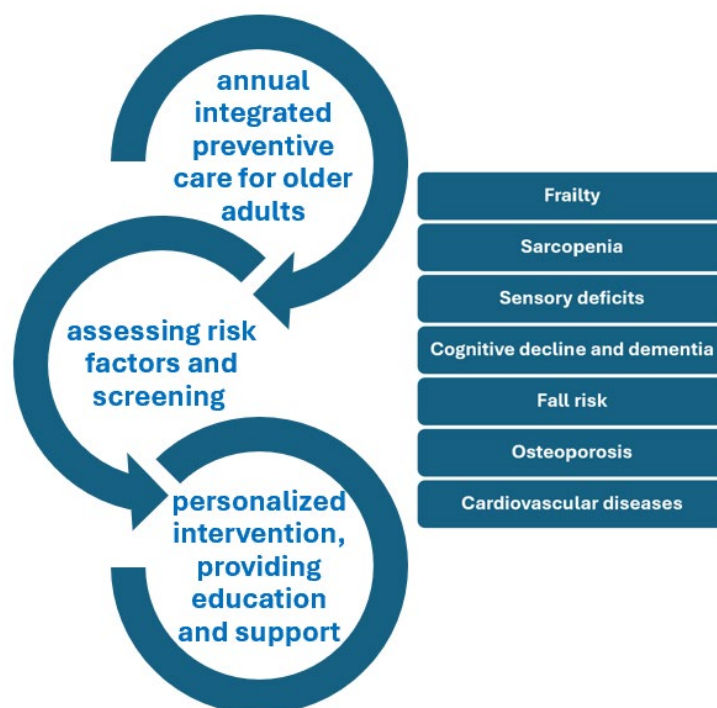


Figure 1. Integrative preventive care in family medicine

2. Materials and Methods

This review outlines key research on the role of family physicians in assessing critical aspects of elderly patients to guide rehabilitation recommendations. A comprehensive search was conducted in the Medline/PubMed database using specific keywords, including elderly, rehabilitation, integrative preventive care, family medicine, and frailty, individually and in combination. Only articles published in English were included. The collected data was analyzed and filtered based on established best practice recommendations.

3. Frailty

The aging process is linked to a decline in an individual's capacity to recover from significant stressors, a characteristic referred to as "frailty"[4]. Frailty manifests at varying rates among different individuals, and its identification relies on a combination of clinical characteristics. Fried et al. have defined the frailty phenotype as the presence of at least three of the following: (1) a weight loss exceeding 4.5 kg in the last year, (2) self-reported exhaustion, (3) weakness in grip strength, (4) slow walking speed, and (5) low physical activity. In the Cardiovascular Health Study Collaborative Research Group cohort, the frailty phenotype was independently linked to falls, worsening disability, hospitalization, and mortality, even after adjusting for baseline disability, comorbidity, and various social factors. Additionally, a prefrail phenotype was identified, where individuals meeting 1–2 of the above criteria showed an elevated risk of progressing to frailty. This aspect is very important because, by providing the opportunity for assessment, including the state of pre-frailty, this tool is useful for the early identification of declines in functional reserves in "apparently healthy" older adults [5]. The frailty phenotype has undergone validation by multiple research groups and is correlated with a diverse range of socioeconomic, behavioral, and other clinical characteristics[6]. In the English Longitudinal Study of Ageing cohort, neuroticism was found to be linked with an increased rate of frailty progression over a 10-year period, while conscientiousness and extroversion exhibited a protective effect[7]. The Rockwood Frailty Index is another tool that can be applied in specialties other than Geriatrics, including Primary Care, and quantifies the deficits present in a person using a comprehensive table of all possible deficits (which requires taking into account at least 30 health-related parameters). These deficits evaluate symptoms, signs, disabilities, pathologies, and laboratory test results performed. A value >0.3 is indicative of frailty, while values between 0.15 and 0.3 suggest pre-frailty. It is a readily accessible test for family doctors who have an overall view of their patients' health and/or illness [5,8]. The Groningen Frailty Index (GFI) also allows for the identification of pre-frailty and frailty among older adults through a questionnaire with 15 questions that assess functional, nutritional, and cognitive status, as well as visual and auditory deficits, comorbidities, and psychosocial function [7].

Conducting systematic screening for frailty in the elderly population is a crucial initiative to mitigate functional decline and reduce hospitalizations[9]. An important element to consider is that the frailty syndrome should be regarded in relation to the progression and prognosis of various chronic pathologies, such as cardiovascular or metabolic diseases. Currently, the European Society of Cardiology recommends including the assessment of frailty as part of the general clinical evaluation of older adults in cardiology practice, effectively advocating for screening for every older adult patient, both for preventive and therapeutic purposes. The American Diabetes Association recommends screening for geriatric syndromes in patients with diabetes, considering that their presence can influence the management of diabetes and quality of life. The American Geriatrics Society (AGS) and the American Endocrine Society also support these recommendations. Other international professional societies share this perspective, all emphasizing the importance of prevention, early detection, and appropriate treatment of frailty as being essential in the type of progression and prognosis of various chronic conditions [10–12]. Another important aspect of elderly assessment is monitoring through telemedicine[13,14]. A study conducted by the team led by Aurelian showed that telemedicine can improve the doctor-patient relationship and therapeutic compliance in elderly patients with comorbidities [15].

4. Sarcopenia

Sarcopenia, defined as the loss of muscle lean mass and muscle strength, plays a significant role in mediating the relationship between frailty and disability[16]. Similar to frailty, there is ongoing debate regarding the definition and measurement of sarcopenia. Nonetheless, a growing consensus in the literature emphasizes the importance of incorporating the assessment of skeletal muscle into clinical routines. This enables the identification and potential management of individuals at an elevated risk of mobility issues and physical disability.

Sarcopenia might serve as the organ-specific pathophysiological foundation for the progressive decline in the physical domain of intrinsic capacity. As a result, it could significantly impact the individual's ability to attain and sustain full functional capacity. This condition may emerge as a novel clinical entity, rightfully incorporated into the consideration of multimorbidity, playing a role as a biological substrate contributing to the frailty of the aging individual[17]. Various groups have proposed diagnostic criteria for sarcopenia, including the International Clinical Practice Guidelines for Sarcopenia (ICFSR), International Working Group on Sarcopenia, European Working Group on Sarcopenia in Older People, and the Foundation for the National Institutes of Health[18]. Common elements across these criteria encompass (1) the identification of muscle mass loss through DEXA scan and (2) a decline in physical performance measures like gait speed, Short Physical Performance Battery (SPPB), or handgrip strength[19].

Failure to identify it in a timely manner is associated with an unfavorable progression exacerbated by functional decline, falls, and increased morbidity and mortality. It is recommended that “older adults over 65 years should be assessed for sarcopenia annually or after the occurrence of major health events.” The updated recommendations from EWGSOP2 (European Working Group on Sarcopenia in Older People 2018) aim to raise “awareness of sarcopenia and its associated risks.” In this regard, it is advised that family physicians treating patients at risk for sarcopenia take measures to promote early diagnosis and therapeutic intervention [20]. The benefits of regular physical activity programs are numerous, impacting not only mental health but also weight, muscle mass, blood pressure, lipid profile, and glycemic control. Treatment primarily revolves around resistance training and nutritional supplementation, often incorporating amino acids [21]. Essential components of management include reducing bed rest time and promoting early mobilization. Currently, selective androgen receptor modulators (SERMs) and myostatin inhibitors are undergoing trials as potential treatment options.

5. Sensory deficits

Aging is linked to the onset of sensory impairments, particularly presbycusis (age-related hearing loss) and visual impairment. Among individuals aged 65 and above, 43% reported experiencing difficulty hearing[22]. The pathophysiology of presbycusis is multifaceted, involving both central and peripheral factors. Age-related changes in the visual system encompass reductions in visual acuity, dark adaptation, contrast sensitivity, and visual processing speed [23]. These changes occur independently of overt pathologies such as glaucoma, macular degeneration, or cataracts.

In addition to the direct functional limitations stemming from these sensory changes, there is an intricate relationship between sensory impairments, cognitive decline, and mental health. Disruptions in one of these domains can exacerbate challenges in the others[24]. For instance, presbycusis is associated with a 30%–40% increase in the rate of cognitive decline (although the direction of causality is not firmly established), and cognitive impairment may contribute to difficulties in distinguishing speech from

background noise. Screening for sensory impairments and the implementation of suitable adaptive equipment play pivotal roles in enhancing functional outcomes among the geriatric population.

6. Cognitive decline and dementia

The prevalence of dementia and mild cognitive impairment tends to rise with age. Mild dementia is frequently underdiagnosed, particularly without specific screening. In a busy office setting, the Mini-Cog, involving a 3-item recall and the Clock Draw Test, proves to be a useful tool for screening cognitive deficits in older adults with memory complaints. If the Mini-Cog yields abnormal results, additional cognitive screening can be carried out. Other validated instruments for cognitive screening include the Mini Mental Status Examination, Saint Louis University Mental Status Examination, and the Montreal Cognitive Assessment. Aging stands out as the most significant risk factor for cognitive decline and Alzheimer's disease (AD)[25]. Notably, individuals often experience accelerated cognitive decline following episodes of hospital delirium[26]. Delirium is characterized by an acute disturbance of consciousness, coupled with changes in cognition, in the presence of a medical cause that could explain these alterations[7,27]. Various factors can trigger delirium, including surgery, sedative medications, disruptions to sleep-wake cycles, infections, constipation, urinary retention, invasive lines, or pain. In addition to addressing reversible factors, implementing protocols for early mobilization in the ICU with the gradual reduction of sedation has demonstrated effectiveness in reducing hospital delirium days. However, mobilizing critically ill patients faces various institutional and practical barriers, along with real and perceived safety concerns. To address these challenges, the use of formal safety guidelines for mobilization can contribute to maintaining consistency and garnering support from the diverse members of the patient's care team. The presence of limited staffing for physical therapists in the ICU can further hinder mobilization efforts at certain institutions, underscoring the importance of clinicians advocating for appropriate resources. Cognitive therapy includes a combination of four general strategies: (1) external memory devices, (2) metacognitive strategies, (3) attention training, and (4) lifestyle modification to accommodate the impairments[28]. Dietary interventions play a crucial role in enhancing cognition and promoting healthy aging[29]. Their benefits are more pronounced when implemented earlier in life and sustained over a longer duration.

7. Fall risk

Annually, a minimum of one-third of individuals aged 65 and above who reside in the community experience a fall [20,30]. Falls among the elderly are associated with significant morbidity and mortality, leading to various complications such as brain injury, spinal cord injury, hip fractures, and other orthopedic trauma.

During the integrated preventive consultation of the elderly, the family doctor also assesses the risk of falling. . Fall risk assessment in primary care content risk stratification algorithm with 12 questions, clinical assessment, assessment of the risks linked to polypharmacy and assessment of the risks of falling at home (Tabel 1) [31,32].

Table 1. Fall risk assesment in primary care

Assessment stages	Scoring			Level of risk of falling
risk stratification algorithm (3±9 questions)	✓ < 4 (positive answer to 3 questions)			low risk of falling
	✓ No severe fall in the last 12 months			low risk of falling
	✓ ≥ 4 (positive answer to 4 or more questions) ✓ No severe fall in the last 12 months	will test strength, balance, and gait, using the following fall assessment tools:	All tests negative	low risk of falling
			One test positive	intermediate risk of falling
		➤ Gait Speed Test (4-metre)	Gait speed of longer than 5 seconds	
		➤ Timed Up-and-Go	A score of ≥14 seconds	
		➤ 30-Second Chair Stand	below average scores regarding age and gen	
		➤ Test 4-Stage Balance Test	can not hold a position for 10 seconds	
	One severe fall in the last 12 months (any of the following) 1. Fall with injuries (bone fracture or severe enough to consult with a physician) 2. Lying on the floor/unable to get up 3. Loss of consciousness/suspected syncope			high risk of falling
	Two falls in last 12 months			high risk of falling
clinical assessment	-check the following symptoms: dizziness, rapid, irregular heartbeat or pounding in the chest, dyspnea, chest pain -measure blood pressure, do an electrocardiogram -vision, hearing assessment -clinical examination of feet -identification and correction of nutritional deficiencies (Vitamin D, calcium) -assessment of depression and anxiety -assessment of osteoporosis (clinical FRAX/FRAX tool) -cognitive assessment			
assessment of the risks linked to polypharmacy	-institutionalized people -identifying patients who use high-alert drugs because of falls risk -identifying patients taking 10 or more drugs -identifying patients with two or more comorbidities -identifying frailty of patient -identifying patients with cognitive deficits			
assessment of the risks of falling at home	-caution towards carpets, electrical cords, stairs, slippery floors -use of night lights that turn on in the dark -identifying the support points in each room -the installation of grab bars and adapted sanitary objects -avoiding leaving objects on the floor or stairs -putting a bell on any pet's collar			

The triage questionnaire initially includes 3 questions. If all registration answers are Yes to these questions, the evaluation continues with the other questions[32,34,35](Tabel 2). If one of the four tests evaluating strength, balance, and gait, using the following fall assessment tools, will be positive, it is estimated that the risk of falling is intermediate [31,32,34]. If in the last year he had at least one severe fall (Tabel1), or two light falls, the risk of falling is considered to be high[32,34].

Table 2. Risk stratification algorithm (3±9 questions) in primary care [32-35]

	Questions	Scoring	
		Yes	No
1	Have you fallen in past year?	2	0
2	Are you worried about falling?	1	0
3	Do you feel unsteady when standing or walking?	1	0
4	I use or have been advised to use a cane or walker	2	0
5	I make sure when walking by leaning on surrounding objects (wall/furniture)	1	0
6	I need to push with my hands to stand up from a chair	1	0
7	I have some trouble stepping up onto a curb	1	0
8	I often have to rush to the toilet	1	0
9	I have lost some feeling in my feet	1	0
10	I take medicine that sometime makes me feel light-headed or more tired than usual	1	0
11	I take medicine to help me sleep or improve my mood	1	0
12	I often feel sad or depressed	1	0

The prevention of falls holds substantial value for individuals, the healthcare system, and society at large. Risk factors for falls are typically classified into two categories: intrinsic factors, which are related to the individual, and extrinsic factors, which are related to the environment. Intrinsic factors encompass advanced age, chronic diseases, muscle weakness, balance control issues, gait disorders, altered mental status, and the effects of medications.

Environmental factors are identified as the primary cause of approximately half of all falls[28]. Examples include uneven or slippery surfaces, loose rugs, inadequate lighting, and obstacles[36]. These environmental factors can be exacerbated by behavioral elements such as inattention or hurrying, discomfort during a task, or moving beyond one's limits of stability.

Assessing and modifying the home environment can decrease the risk of falls in the elderly. Occupational therapists, in particular, play a significant role in recommending modifications like removing loose rugs, installing nightlights, and adding bathroom grab bars, proving more effective in fall prevention[37]. Exercise, enhancing strength, balance, and reducing fear of falling, has a substantial impact on fall. A significant improvement in physical activity was observed following programs designed for the elderly in specialized centers and after participation in therapeutic education programs[38,39]. Exercise programs targeting balance, functional training, and multicomponent approaches are particularly effective, with tai chi showing promise[40].

Weighted stair-climbing exercise and pilot programs combining various interventions have also demonstrated positive outcomes [41].

Also, chronic pain and cognitive impairment correlate with a higher risk of falls, and their interrelation has been established [42]. Sensory deficits (vision, hearing), along with cognitive disorders of various degrees up to dementia, depression, and behavioral and personality disorders, can contribute to the occurrence of falls [43]. The risk of falling may also be exacerbated by the administration of various medications, such as antihypertensives (vasodilators, diuretics) that can induce orthostatic hypotension, antidiabetics that carry a risk of hypoglycemia, anticholinergics that can cause confusion up to delirium, antidepressants, antipsychotics, or benzodiazepines that may lead to reduced vigilance and/or extrapyramidal syndromes [43,44].

A multifactorial assessment of fall risk is very important in medical practice and includes evaluating gait and balance, medication assessment (Beers Criteria), cognitive evaluation (MMSE - Mini Mental State Examination), fear of falling, cardiovascular assessment, vestibular disorders, sensory evaluation (hearing, vision), depression assessment, nutritional evaluation, and, last but not least, assessment of fracture risk (FRAX test) [32,44,45]. There is a gap in clinical practice for the prescription of rehabilitation programs in patients with osteoporosis [46].

All these aspects are components of the clinical evaluation performed by the family physician during integrated preventive consultations [32,45,47].

Interventions can be preventive, focused on minimizing risk factors or therapeutic [32,47,48]. Medical rehabilitation procedures should be recommended as early as possible [32,48]. A healthy diet, physical therapy, physiotherapy, balneotherapy, and psychotherapy are some of the recommendations that can contribute to the concept of healthy aging [32,49]. Cognitive training, addressing the link between attention and falls, has been incorporated into therapy programs for the elderly, leading to improved outcomes compared to programs focusing solely on strength and balance [44,45,47].

8. Hip fractures

One of the primary concerns leading to functional decline, nursing home admission, or even mortality is a femur fracture resulting from a fall. Hip fractures in the elderly often stem from low-trauma incidents, such as simple falls, compromised balance, and osteoporosis [32]. Managing femur fractures is a complex, multi-professional, and interdisciplinary process, with various papers and guidelines available for reference [49]. As the aging population grows, hip fractures become an increasingly prevalent issue. The risk of falls and subsequent low-trauma fractures rises with age, occurring both indoors and outdoors throughout the year. Frail individuals face a higher risk of indoor falls due to potential "traps" [50]. The functional independence of patients with periprosthetic fractures is significantly impaired and correlates with frailty status and advanced age [51].

The beneficial role of physical exercise included in rehabilitation programs for patients with osteoporosis or vitamin D deficiency is well known [52-55]. To enhance outcomes after fixing a fractured bone, a physiatrist should assess pre-traumatic mobility and activity levels. Utilizing tools like the Parker mobility score provides valuable insights into walking habits and outdoor activity levels, offering predictive information about the overall outcome [56]. Commencing rehabilitation involves early discussions about discharging patients back home, with active involvement of patients and their primary care physician from the outset [32,42]. A thorough examination of the home environment is crucial for identifying potential risks for future falls [32]. Modifying elements in the bathroom, toilet, and bedroom can enhance safety at home. Occupational therapists and physiotherapists demonstrate the use of walking aids and provide assistance for daily living [45,47]. Additionally, considerations for social support, including home

help, nursing assistance, and meal services, should be initiated early on to encourage compliance [45,47]. Rhythmic gymnastics programs adapted for the elderly are recommended to improve flexibility in the hips, knees, and shoulders [58].

9. Stroke recovery

Stroke stands as a prominent cause of disability in the elderly, with 17% of all stroke patients being over the age of 85 (American Heart Association, 2018). Within this age bracket, stroke patients experience lengthier hospitalizations and a higher likelihood of institutionalization[49].

The elderly stroke population faces distinctive challenges, including multiple medical comorbidities and cognitive impairment, contributing to poorer functional outcomes[50].

The initial consequences of a stroke in the acute phase are widely acknowledged. However, for numerous stroke survivors and their families, the acute stroke marks the commencement of an enduring battle with physical impairment and subsequent disability[57]. Over time, the immediate clinical repercussions of the stroke are further complicated by various medical, musculoskeletal, and psychosocial challenges. The primary healthcare physician holds a crucial role in optimizing chronic disease control and addressing and minimizing any complications that may arise.

A history of prior stroke is an important risk factor for subsequent stroke development. Individuals who have experienced a stroke are four times more likely to have another stroke compared to matched controls [58]. Implementing secondary preventative measures, such as antithrombotic therapy, treating hypertension, managing diabetes mellitus, lowering elevated low-density lipoprotein (LDL) cholesterol and triglyceride levels, anticoagulation for atrial fibrillation (AF), and smoking cessation, can effectively reduce the recurrence rates[57-59].

Early rehabilitation within the first 20 days post-stroke is associated with improved functional outcomes, as supported by studies such as AVERT in Australia[59]. A team-based, multidisciplinary rehabilitation approach is generally preferred over an individual consultative approach. Prospective studies have compared inpatient rehabilitation settings (IRF) to skilled nursing facilities (SNFs), showing self-care score improvements at discharge, with more substantial gains in function for IRF patients after 6 months[60]. A study conducted by Usuda showed that the functional independence of patients with stroke after stroke rehabilitation in cerebrovascular diseases was correlated with the duration of hospitalization, age, and disability severity, but not with dementia or a past history of cerebrovascular diseases [59].

Comprehensive rehabilitation guidelines by the American Heart Association/American Stroke Association cover all care levels, including nursing needs and prevention of complications. Domains of rehabilitation include aphasia, cognitive rehabilitation, falls prevention, gait training, hemineglect, apraxia, orthotics, and various global strategies like task-oriented and repetitive therapy. Specific strategies for upper extremity include constraint-induced movement therapy, while bodyweight-supported treadmill training is explored for the lower extremity.

The guidelines also discuss the evidence behind specific interventions such as Transcutaneous Electrical Nerve Stimulation (TENS), music gait therapy, robotic-assisted therapy, biofeedback, water-based therapy, and acupuncture. Pharmacologic interventions like fluoxetine have shown mixed results in motor recovery, with ongoing studies exploring CCR5 receptor antagonism and transcranial magnetic stimulation (TMS) in chronic stroke patients [58]. Emerging neuromodulation techniques, including intracallosal inhibition and paired associative techniques, offer promising avenues, but the optimal timing, dosage, and combination of therapies for sustained benefits remain uncertain [58,59].

In summary, stroke survivors often experience diverse medical, musculoskeletal, and psychosocial complications in the months to years following the initial event[64,65]. These complications can compound the original disability caused by the stroke. Primary care physicians, given their advantageous position, are frequently tasked with addressing these complications[59]. Given the prevalence of stroke, primary care physicians can enhance care by comprehending the potential complications that may emerge in the aftermath of a cerebrovascular event.

10. Cardiac rehabilitation

The consequences of coronary artery disease (CAD) may significantly limit functional independence of elderly patients. While cardiac rehabilitation (CR) exercise programs have been shown to improve health outcomes such as exercise capacity, the specific impact on elderly patients with coronary artery disease remains a critical consideration. A study was conducted that aimed to evaluate the effects of a 20-session CR program on the physical fitness and functional independence of elderly individuals with CAD [56].

The results demonstrated that participation in the CR program was effective in enhancing objective measures of physical fitness. The inclusion of both aerobic and resistance training components contributed to improvements in cardiovascular endurance, upper and lower body strength, and balance-coordination. These findings are consistent with previous studies emphasizing the value of combined aerobic and resistance training for older patients in CR [56-58].

Furthermore, the study highlighted the significance of maintaining muscular strength and endurance for elderly individuals, essential components for preserving independence in activities of daily living[59]. The observed improvements in the Cardiac Surgery-Prom instrument scores underscored the positive impact of the CR program on musculoskeletal fitness and overall physical independence, particularly notable for female patients[58,59]. However, the study noted a discrepancy between objective performance-based measures of physical fitness and self-reported assessments[57]. This disparity may be attributed to factors such as patient perception, habitual routines, and the limitations of self-report instruments in capturing subtle but clinically relevant changes in functional status. Recovery programs that involve physical activity in water play an important role in the rehabilitation of patients with cardiovascular diseases: arterial hypertension, heart failure [58]. In a cross-sectional study conducted by Iovanovici et al., patient age, weight, and heart failure-related comorbidities were identified as key predictors of physical health [59].

To summarize, the study suggests that CR exercise programs incorporating aerobic and resistance training components can effectively enhance physical fitness and functional independence in elderly patients with CAD and other comorbidities. The comprehensive approach targeting cardiovascular health, muscle strength, and balance-coordination contributes to improved outcomes and underscores the importance of tailored interventions for this population group. Also, through counseling and active monitoring, the family physician can enhance adherence to chronic treatment in cardiovascular diseases, independence in activities of daily living, and physical capacity of people with cardiovascular diseases. A study led by Neamtu AC shows that using tools to assess adherence to rehabilitation programs brings benefits to both physical and mental health, even improving adherence to treatment for patients with cardiovascular conditions (such as hypertension). On the other hand, pharmacological treatment helps ensure good results during regular physical exercise [59]. The limited number of cardiovascular rehabilitation centers and the uneven coverage of these services by health insurance restricts public access to them, especially in rural areas.

11. Conclusions

Rehabilitating elderly patients poses unique challenges, given the confluence of age-related changes, comorbidities, and psychosocial factors. Compared to younger individuals, elderly patients often necessitate lower medication doses, extended rehabilitation periods, and heightened attention to cognitive and physical impairments. Healthcare providers involved in their care should be well-versed in the distinctive needs of this population and should adhere to the fundamental principles of geriatric medicine. An integrated approach to elderly patients is crucial and necessitates a multidisciplinary team, including specialists from Family Medicine, Geriatrics, Balneoclimatology, and Physical and Rehabilitation Medicine, with each discipline clearly defined in its responsibilities.

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References

1. Gimigliano, F.; Negrini, S. The World Health Organization “Rehabilitation 2030: a call for action”. *Eur J Phys Rehabil Med.* 2017 Apr;53(2):155–68. doi: <http://dx.doi.org/10.23736/S1973-9087.17.04746-3> PMID: 28382807
2. Gemperli, A.; Essig, S. The role of primary and community care in rehabilitation, *Sec. Strengthening Rehabilitation in Health Systems*, vol. 4–2023, Doi.org/10.3389/fresc.2023.1235049
3. Integrated care for older people (ICOPE): guidance for person-centred assessment and pathways in primary care, <https://www.who.int/publications/i/item/WHO-FWC-ALC-19.1> accessed on 21 August 2024
4. Walston, J.; Hadley, E.C.; Ferrucci, L. et al. Research agenda for frailty in older adults: toward a better understanding of physiology and etiology. *J Am Geriatr Soc* 2006, 54: 991–1001. <https://doi.org/10.1111/j.1532-5415.2006.00745.x>
5. Donca, V.; Avram, L. *Essential in Geriatric*, p. 35–55, Ed. Casa Cartii de Stiinta, Cluj-Napoca, 2024, ISBN 978-606-17-2343-0
6. Fried, L.P.; Tangen, C.M.; Walston, J. et al. Frailty in older adults: evidence for a phenotype. *J Gerontol A Biol Sci Med Sci* 2001, 56: M146–M156
7. Gale, R.; Möttus, R.; Deary, J.; Cooper, C.; Sayer, A. Personality and Risk of Frailty: the English Longitudinal Study of Ageing. *Annals of Behavioral Medicine*, Volume 51, Issue 1, February 2017, Pages 128–136, <https://doi.org/10.1007/s12160-016-9833-5>
8. Sophie, B.; Rogers, E.; Rockwood, E.; Theou, O. A scoping review of Clinical Frailty Scale, *BMC Geriatrics*, 2020, Article number: 393, <https://doi.org/10.1186/s12877-020-01801-7>
9. Cruz-Jentoft, A.J.; Bahat, G.; Bauer, J.; Boirie, Y.; Bruyère, O.; Cederholm, T. et al Sarcopenia: revised European consensus on definition and diagnosis. *Age Ageing* 2019, 48:16–31. <https://doi.org/10.1093/ageing/afy169>
10. Derek, L.R.; Geert, J. B.; Braithwaite S.S.; Casanueva, F.F.; Draznin, B.; Halter, J.B.; Hirsch, I.B.; McDonnell, M.E.; Molitch, M.E.; Murad, M.H.; Sinclair, A.J. Treatment of Diabetes in Older Adults: An Endocrine Society Clinical Practice Guideline, *The Journal of Clinical Endocrinology & Metabolism*, Volume 104, Issue 5, May 2019, Pages 1520–1574, <https://doi.org/10.1210/jc.2019-00198>
11. ElSayed, N.A.; Aleppo, G.; Aroda, V.R.; Bannuru, R.R.; Brown, F.M.; Bruemmer, D.; Collins, B.S.; Hilliard, M.E.; Isaacs, D.; Johnson, E.L. et al. On behalf of the American Diabetes Association, 13. Older Adults: Standards of Care in Diabetes—2023. *Diabetes Care* 1 January 2023; 46 (Supplement_1): S216–S229. <https://doi.org/10.2337/dc23-S013>
12. Richter, D. et al. Frailty in cardiology: definition, assessment and clinical implications for general cardiology. A consensus document of the Council for Cardiology Practice (CCP), Association for Acute Cardio Vascular Care (ACVC), Association of Cardiovascular Nursing and Allied Professions (ACNAP), European Association of Preventive Cardiology (EAPC), European Heart Rhythm Association (EHRA), Council on Valvular Heart Diseases (VHD), Council on Hypertension

- (CHT), Council of Cardio-Oncology (CCO), Working Group (WG) Aorta and Peripheral Vascular Diseases, WG e-Cardiology, WG Thrombosis, of the European Society of Cardiology, European Primary Care Cardiology Society (EPCCS), European Journal of Preventive Cardiology, Volume 29, Issue 1, January 2022, Pages 216–227, <https://doi.org/10.1093/eur-jpc/zwaa167>
13. Miulescu, A.; Kozma, A.; Cucu, D. Digital Medicine : from SPA to Medical Recovery. *Balneo and PRM Research Journal*. 2023;14(4):635 DOI 10.12680/balneo.2023.635
 14. Ciucă-Pană, M.A.; Șerbănoiu, L.I.; Cojocaru, V.; Olteanu, G.; Andronic, O.; Lăcraru, A.; Ion, A.; Andrei, C.; Sinescu, C.; Suceveanu, M.C.; Mandu, M.; Onose, G.; Pedretti, R.; Niebauer, J.; Busnatu, S.S. Assessment of on-site and remote cardiac rehabilitation in Romania. *Balneo and PRM Research Journal*. 2023;14(4):621 10.12680/balneo.2023.621
 15. Aurelian, S.M.; Aurelian, J.; Stoica, S.I.; Vlădulescu-Trandafir, A.I.; Zamfirescu, A.; Onose, G. How do physicians estimate cardiovascular risk in the elderly using E-health - a pilot study. *Balneo and PRM Research Journal*. 2024;15(4):761 DOI 10.12680/balneo.2024.761
 16. Cesari, M.; Nobili, A.; Vitale, G. Frailty and sarcopenia: From theory to clinical implementation and public health relevance. *Eur J Intern Med* 2016, 35:1–9. <https://doi.org/10.1016/j.ejim.2016.07.021>
 17. Muscaritoli, M.; Anker, S.D.; Argiles, J. et al. Consensus definition of sarcopenia, cachexia and pre-cachexia: joint document elaborated by Special Interest Groups (SIG) “cachexia-anorexia in chronic wasting diseases” and “nutrition in geriatrics”. *Clin Nutr* 2010, 29: 154–159.
 18. Marty, E.; Liu, Y.; Samuel, A. et al. A review of sarcopenia: enhancing awareness of an increasingly prevalent disease. *Bone* 2017, 105: 276–286. <https://doi.org/10.1016/j.bone.2017.09.008>.
 19. Wakabayashi, H.; Sakuma, K. Rehabilitation nutrition for sarcopenia with disability: a combination of both rehabilitation and nutrition care management. *J Cachexia Sarcopenia Muscle* 2014, 5: 269–277. <https://doi.org/10.1007/s13539-014-0162-x>
 20. Forti, P.; Maioli, F.; Magni, E.; Ragazzoni, L.; Piperno, R.; Zoli, M.; Coveri, M.; Procaccianti, G. Risk of Exclusion From Stroke Rehabilitation in the Oldest Old. *Arch Phys Med Rehabil*. 2018 Mar;99(3):477–483. doi: 10.1016/j.apmr.2017.08.469.
 21. Ries, P.W. Prevalence and characteristics of persons with hearing trouble: United States, 1990–91. *Vital Health Stat* 1994, 10 (188): 1–75.
 22. Whitson, H.E.; Cronin-Golomb, A.; Cruickshanks, K.J. et al. American Geriatrics Society and National Institute on aging bench-to-bedside conference: sensory impairment and cognitive decline in older adults. *J Am Geriatr Soc* 2018, 66: 2052–2058. <https://doi.org/10.1111/jgs.15506>
 23. Holsinger, T.; Deveau, J.; Boustani, M. et al. Does this patient have dementia? *JAMA* 2007, 297: 2391–2404.
 24. Fong, T.G.; Jones, R.N.; Shi, P. et al. Delirium accelerates cognitive decline in Alzheimer disease. *Neurology* 2009, 72: 1570–1575.
 25. American Psychiatric Association. Diagnostic and statistical manual of mental disorders, fifth edn. American Psychiatric Association, Arlington, VA. 2013. <https://doi.org/10.1176/appi.books.9780890425596>
 26. Cicerone, K.D.; Langenbahn, D.M.; Braden, C. et al. Evidence-based cognitive rehabilitation: updated review of the literature from 2003 through 2008. *Arch Phys Med Rehabil* 2011, 92: 519–530.
 27. Tinetti, M.E.; Speechley, M.; Ginter, S.F. Risk factors for falls among elderly persons living in the community. *New Engl J Med* 1988, 319: 1701–1707.
 28. Surugiu, R.; Iancu, M.A.; Vintilescu, Ș.B.; Stepan, M.D.; Burdusel, D.; Genunche-Dumitrescu, A.V.; Dogaru, C.A.; Dumitra G.G. Molecular Mechanisms of Healthy Aging: The Role of Caloric Restriction, Intermittent Fasting, Mediterranean Diet, and Ketogenic Diet-A Scoping Review. *Nutrients*. 2024 Aug 28;16(17):2878. doi: 10.3390/nu16172878.
 29. Okumiya, K.; Matsubayashi, K.; Nakamura, T. et al. The timed “up & go” test is a useful predictor of falls in community-swelling older people. *J Am Geriatr Soc* 1998; 46(7):928–30.
 30. <https://ghidurimedical.ro/2023/ghid-accidente.pdf> accessed on March 2024
 31. Connell, B.R. Role of the environment in falls prevention. *Clin Geriatr M*. 1996, Nov;12(4):859-80 [https://doi.org/10.1016/S0749-0690\(18\)30205-2](https://doi.org/10.1016/S0749-0690(18)30205-2)
 32. Vivrette, R.L.; Rubenstein, L.Z.; Martin, J.L.; Josephson, K.R.; Kramer, B.J. Development of a fall-risk self-assessment for community-dwelling seniors. *J Aging Phys Act*. 2011 Jan;19(1):16-29. doi: 10.1123/japa.19.1.16. PMID: 21285473; PMCID: PMC3383800.
 33. Southerland, L.T.; Slattery, L.; Rosenthal, J.A.; Kegelmeyer, D.; Kloos, A. Are triage questions sufficient to assign fall risk precautions in the ED? *Am J Emerg Med*. 2017 Feb;35(2):329-332. doi: 10.1016/j.ajem.2016.10.035.
 34. Gillespie, L.D.; Robertson, M.C.; Gillespie, W.J. et al. Interventions for preventing falls in older people living in the community. *Cochrane Database Syst Rev* 2012, Sep 12;2012(9):CD007146. doi: 10.1002/14651858.CD007146.
 35. Tsang, W.W.; Hui-Chan, C.W. Effect of 4- and 8-wk intensive Tai Chi Training on balance control in the elderly. *Med Sci Sports Exerc* 2004, Apr;36(4):648-57. doi: 10.1249/01.mss.0000121941.57669.bf.
 36. Bean, J.; Herman, S.; Kiely, D.K. et al. Weighted stair climbing in mobility-limited older people: a pilot study. *J Am Geriatr Soc* 2002, Apr;50(4):663-70. doi: 10.1046/j.1532-5415.2002.50160.x.

37. Leveille, S.G.; Jones, R.N.; Kiely, D.K. et al. Chronic musculoskeletal pain and the occurrence of falls in an older population. *JAMA* 2009, Nov 25;302(20):2214-21. doi: 10.1001/jama.2009.1738.
38. Roberts, K. et al. AAOS clinical practice guideline summary: management of hip fractures in the elderly. *J Am Acad Orthop Surg*. 2015;23:131–7. doi:10.5435/JAAOS-D-14-00432
39. Montero-Odasso, M. et al. The Task Force on Global Guidelines for Falls in Older Adults , World guidelines for falls prevention and management for older adults: a global initiative, Age and Ageing, Volume 51, Issue 9, September 2022, afac205, <https://doi.org/10.1093/ageing/afac205>
40. STEADI-Older Adult Fall Prevention, <https://www.cdc.gov/steady/hcp/clinical-resources/index.html> accessed on August 2024
41. Seijas, V.; Maritz, R.; Mishra, S.; Bernard, R.M.; Fernandes, P. et al, Rehabilitation in primary care for an ageing population :a secondary analysis from a scoping review of rehabilitation delivery models, BMC Health Serv Res., 2024 Feb 13 ;24(1):193. Doi:10.1186/s12913-024-10694-w
42. Nistor, S.C.; Iliescu, M.G.; Ciobanu, I.; Popa, F.L.; Ciobica, M.L.; Sima, O.C.; Popa-Velea, O.; Carsote, M. Physical exercise as part of the rehabilitation in primary osteoporosis: insights into the signal transduction bone formation pathways. *Balneo and PRM Research Journal*. 2024;15(2):693 Full Text DOI 10.12680/balneo.2024.693
43. Hoy, J.; Alteren, J.; Kvigne, K. Rehabilitation of the frail older adults in primary healthcare in rural areas: a scoping review protocol, *BMJ Open*. 2021;11(6):e048820, Doi:10.1136/bmjopen-2021-048820
44. Hodyl, N.; Mason, G.; Ribbons, K.; Bailey, L. et al, Barriers and Enablers for Accessing Rehabilitation Services :Findings From the Rehabilitation Choices Study, Part 1-Healthcare Professionals, Health Expect, 2024 Jun ;27(3):e14120, Doi:10.1111/hex.14120
45. Robbins, A.S.; Rubenstein, L.Z.; Josephson, K.R.; Schulman, B.L.; Osterweil, D.; Fine, G. Predictors of falls among elderly people. Results of two population-based studies. *Arch Intern Med*. 1989 Jul;149(7):1628-33. PMID: 2742437.
46. Robinovitch, S.N. et al. Video capture of the circumstances of falls in elderly people residing in long-term care: an observational study. *Lancet*. 2013;381(9860):47–54.
47. Cumming, T.B.; Thrift, A.G.; Collier, J.M. et al. Very early mobilization after stroke fast-tracks return to walking: further results from the phase II AVERT randomized controlled trial. *Stroke* 2011, Jan;42(1):153-8. doi: 10.1161/STROKEAHA.110.594598.
48. Parker, M.J.; Palmer, C.R. A new mobility score for predicting mortality after hip fracture. *J Bone Joint Surg Br*. 1993 Sep;75(5):797-8. doi: 10.1302/0301-620X.75B5.8376443.
49. Chan, L.; Sandel, M.E.; Jette, A.M. et al. Does postacute care site matter? A longitudinal study assessing functional recovery after a stroke. *Arch Phys Med Rehabil* 2013, Apr;94(4):622-9. doi: 10.1016/j.apmr.2012.09.033.
50. Chollet, F.; Tardy, J.; Albucher, J.-F. et al. Fluoxetine for motor recovery after acute ischaemic stroke (FLAME): a randomised placebo-controlled trial. *Lancet Neurol*, 2011, Feb;10(2):123-30. doi: 10.1016/S1474-4422(10)70314-8.
51. Hoyer, E.H.; Celnik, P.A. Understanding and enhancing motor recovery after stroke using transcranial magnetic stimulation. *Restor Neurol Neurosci* 2011, 29: 395–409. <https://doi.org/10.3233/RNN-2011-0611>
52. Bertolucci, F.; Chisari, C.; Fregni, F. The potential dual role of transcallosal inhibition in post-stroke motor recovery. *Restor Neurol Neurosci* 2018;36: 83–97. <https://doi.org/10.3233/RNN-170778>
53. Evans, N.R.; Todd, O.M.; Minhas, J.S.; Fearon, P.; Harston, G.W.; Mant, J.; Mead, G.; Hewitt, J.; Quinn, T.J.; Warburton, E.A. Frailty and cerebrovascular disease: Concepts and clinical implications for stroke medicine. *Int J Stroke*. 2022 Mar;17(3):251-259. doi: 10.1177/17474930211034331.
54. Chohan, S.A.; Venkatesh, P.K.; How, C.H. Long-term complications of stroke and secondary prevention: an overview for primary care physicians. *Singapore Med J*. 2019 Dec;60(12):616-620. doi: 10.11622/smedj.2019158.
55. Johnston, M.; MacDonald, K.; Manns, P.; Senartne, M. et al. Impact of cardiac rehabilitation on the ability of elderly cardiac patients to perform common household tasks; *J Cardiopulm Rehabil Prev*. 2011 Mar-Apr;31(2):100-4. doi: 10.1097/HCR.0b013e3181f1fd8c.
56. Iancu, M.A.; Diaconu, C.C.; Dediu, G.N.; Balaceanu, L.A.; Matei, R.S.; Matei, D. An analysis of hypertensive male patients addressed to a primary care practice. *Journal of Hypertension* , sept 2016, vol 34, -e- Supplement 2- ESH2016 abstract book, e323, pp 32.21. DOI 10.1097/01.hjh.0000492291.09500.3a
57. Ciubotaru, C.; Clipota, A.; Condur, L.M.; Onose, G.; Teleki, N. Medicul de familie-partener in preventia si monitorizarea pacientului necesitant in Recuperate, *Medicina Fizica si Balneoclimatologie*, Medica Academica supl. dec. 2018, ISSN 2067-0605
58. Iancu, M.A.; Mateiciuc, I.-I.; Stanescu, A.-M.A.; Matei, D.; Diaconu, C.C. Therapeutic Compliance of Patients with Arterial Hypertension in Primary Care. *Medicina* 2020, 56, 631. <https://doi.org/10.3390/medicina56110631>
59. Diaconu, C.C.; Istratie, B.; Nastasa, A.; Zaki, A.R.; Balaceanu, L.A.; Iancu, M.A. An age-related comparison between comorbidities and treatment of hypertensive patients. *Journal of Hypertension*, sept 2016, vol 34, -e- Supplement 2- ESH2016 abstract book, e321, pp.32.13. DOI 10.1097/01.hjh.0000492283.81683.1a