



Review Article

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Frailty: Assessment and Intervention

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Frailty poses a complex challenge to the health and well-being of aging populations, particularly in South Korea, where its prevalence is substantial and increasing. This review explores the landscape of frailty assessment and management in Korea, emphasizing the transition from a disease-centric approach to one focused on maintaining functional abilities and promoting healthy aging. This review covers various frailty screening tools, comprehensive geriatric assessment methods, and targeted interventions across domains such as polypharmacy, physical activity, nutrition, oral health, vitamin D supplementation, cognitive function, falls, and social frailty. The integration of these strategies aims to address the multifaceted nature of frailty and improve health outcomes for older adults. Furthermore, the importance of regular monitoring and reassessment is highlighted to guide personalized interventions and optimize outcomes, particularly for older adults with chronic illnesses. Through a multifaceted approach encompassing medical, social, and functional dimensions, this review advocates for effective frailty management to enhance the health and well-being of elderly in Korea and globally.

Keywords: Frailty, Geriatrics, Nutrition, Polypharmacy

Introduction

The World Health Organization redefined healthy aging in 2001 as the capacity to engage in personally meaningful activities as individuals age, regardless of disease burden [1]. This paradigm shift highlights the transition from a pathology-focused healthcare approach to one centered on maintaining functional abilities.

The Ministry of Health and Welfare of Korea, through the fifth iteration of the National Health Plan (Health Plan 2030) in 2022, prioritized the transition from managing chronic diseases to fostering health-promoting behaviors and preventing frailty [2]. It advocates for restructuring the public health services for older adults, moving away from an exclusive focus on chronic disease management toward a comprehensive healthcare system encompassing frailty prevention. Additionally, the plan highlights the need to explore avenues for delivering frailty management services within primary healthcare settings [2].

Frailty is a multifaceted biological syndrome characterized by reduced physiological reserve and increased susceptibility to stressors [3]. This condition stems from the progressive decline across various physiological systems, rendering individuals more susceptible to adverse health outcomes and functional decline [3]. Frailty is defined by the presence of three or more of the following five Fried frailty phenotype criteria: weight loss, exhaustion, decreased energy expenditure, decreased walking speed, and decreased grip strength [4]. When an individual exhibits one or two of these phenotype criteria, they are considered to be in a pre-frail state, while the absence of all indicates robustness [4].

Applying the Fried frailty phenotype criteria to the data from South Korea in 2008, the prevalence of frailty and pre-frailty was found to be 7.8% and 50.4%, respectively [5]. This indicates that more than half of the surveyed population displayed characteristics of frailty or pre-frailty [5]. It is known that the prevalence of frailty increases with age, and South Korea's older adult population is growing continually [6]. The proportion of individuals aged ≥ 65 years in South Korea is estimated to increase from 17.5% in 2022 to 46.4% by 2070 [7]. Therefore, frailty can be considered a significant medical and social issue in Korea. Assessing frailty is crucial for identifying individuals at risk and implementing targeted interventions to mitigate its impact on overall health and quality of life. Therefore, this review aims to investigate the screening, comprehensive assessment, and management of frailty in older adults in South Korea.

Frailty screening and assessment tools

Internationally used frailty assessment tools include the fatigue, resistance, ambulation, illnesses, and loss of weight (FRAIL) Scale, Program of Research to Integrate the Services for the Maintenance of Autonomy 7, Fried frailty phenotype, Groningen Frailty Indicator, frailty index, Clinical Frailty Scale, Edmonton Frail Scale, and Tilburg Frailty Indicator (TFI) [8,9]. These tools often utilize self-reported questionnaires and assess vision, hearing, general health status, gait speed, cognitive function, and social functioning. They may vary in the types of items assessed, time required for evaluation, and scoring methods. Performing physical examinations, such as gait speed and grip strength, may decrease the actual utilization rate in primary healthcare settings due to time constraints. The Frailty Phenotype Questionnaire solely comprises survey items, making it suitable for screening assessments in primary healthcare settings [10]. Since the Korean version of the FRAIL Scale is designed with only five items, it is convenient to administer in primary healthcare environments. Screening using the Korean Frailty Index for Primary Care (KFI-PC) begins with a 5-item questionnaire for a preliminary assessment. If three or more items indicate frailty, then further assessment is conducted using the full KFI-PC [11]. This assessment includes 56 items to identify risk factors for frailty, such as malnutrition, lack of exercise, muscle weakness, social inactivity, and cognitive impairment [10,11]. The characteristics of these tools are summarized in Table 1.

Comprehensive geriatric assessment

Comprehensive Geriatric Assessment (CGA) plays a vital role in addressing frailty by evaluating various aspects of the older person's health [12]. By identifying and addressing multiple factors contributing to frailty, interdisciplinary CGA interventions have reduced the risk of hospitalization by approximately 10% in older individuals with frailty [13]. Its holistic approach ensures tailored interventions to meet specific needs, thereby enhancing overall health and well-being [13]. The Korean Brief Comprehensive Geriatric Assessment Questionnaire, developed in 2006, lacked tracking observations for positive findings identified during screening, thus limiting its practical utility [14]. The Korean Comprehensive Assessment Tools were developed in 2013 to address this, offering a short form suitable for use in primary healthcare settings where time constraints are a concern [15]. The characteristics of the three aforementioned Korean CGA tools are presented in Table 2.

Interventions

Polypharmacy

Polypharmacy can lead to inappropriate medication prescriptions in older adults, increasing the risk of adverse effects. Reviewing and adjusting polypharmacy can reduce emergency room visits and medication costs and improve the quality of life [16]. The 2023 Beer criteria are international guidelines on medication usage in older adults. They help healthcare professionals make better decisions about managing medications for older patients, ensuring their health and safety [17]. According to a study on the current status of polypharmacy in South Korea and strategies for appropriate management, the introduction of the Drug Utilization Review in South Korea has played a significant role in preventing adverse effects resulting from inappropriate medication prescriptions [18].

Physical activity

Individuals with frailty are advised to engage in physical activities, including resistance, aerobic, and balance exercises [12]. However, the type and intensity of exercise that older people with frailty can safely perform vary from person to person. Therefore, prioritizing the assessment of physical activity capacity is essential. In this regard, objective measurement tools, such as Short Physical Performance Battery, Physical Activity Readiness Questionnaire, and Senior Fitness

Table 1. Frailty screening and assessment tools

Title	Country	Year	Time (min)	Number of items	Components	Frailty classification	Korean version
FRAIL Scale	US	2008	< 10	5	Fatigue, resistance, ambulation, illness, loss of weight	Frailty 3 items; pre-frail 1–2 items; robust = 0 items	Available
PRISMA-7	Canada	2008	< 10	7	Self-reported: age (85 years), male, social support and ADLs	Frailty: score \geq 3	NA
Frailty phenotype questionnaire	US	2001	< 10	5	It assesses physical characteristics or phenotype, which include five domains: unintentional weight loss (4.5 kg or more in the last year), exhaustion (self-reported), low physical activity, weakness (low grip strength), and walking speed.	Frailty: \geq 3 items; pre-frailty: 1–2 items; robust: 0 items	NA
Groningen Frailty Indicator	Netherlands	2001	< 15	15	Physical (9 items), cognitive (1 item), social (3 items), and psychological (2 items), for a total of 4 dimensions.	Frailty: score \geq 4	NA
Frailty Index	Canada	2001	30	30–70	All the 8 frailty items and all the 3 domains (physical, psychological and social) are assessed.	Frailty: score > 0.25; pre-frailty: 0.12–0.25; robust: score < 0.12	NA
Clinical Frailty Scale	Canada	2005	< 5	1	Total 9 points: each point on its scale has a visual chart and a written description of frailty to assist the classification process.	Frailty: score \geq 5	NA
Edmonton Frail Scale (EFS)	Canada	2006	< 5	9	The EFS is an 11-item scale, of which 9 items are self-reported, it assesses nine domains of frailty (cognition, general health status, functional independence, social support, medication usage, nutrition, mood, continence, functional performance).	Cut-offs are used to classify frailty severity: not frailty (0–5), apparently vulnerable (6–7), mildly frailty (8–9), moderately frailty (10–11) and severely frailty	NA
Tilburg Frailty Indicator	Netherlands	2010	< 15	15	The TFI is composed of 2 parts: Part A about "determinants of frailty and diseases", and Part B about the "presence of frailty" that generates a final score. Part B includes three domains (physical, psychological, and social) and 15 items.	Frailty: score \geq 5	NA
Screening questionnaire for frailty	South Korea	2019	< 5	5	Fatigue, muscle weakness, reduced walking speed, decreased physical activity, weight loss	Frailty: \geq 3 items; pre-frailty: 1–2 items; robust: 0 items	Available
Korean Frailty Index	South Korea	2010	< 5	8	Overall health status, including the frequency of hospitalizations and subjective health assessments. Medication usage patterns. Nutritional status, particularly any instances of weight loss. Emotional well-being, focusing on symptoms of depression. Incidences of urinary incontinence. Mobility and walking capabilities. Communication abilities, with attention to any impairments in hearing.	Frailty: \geq 3 items; pre-frailty: 1–2 items; robust: 0 items	Available
Korean Frailty Index for Primary Care	South Korea	2020	30	53	Cognitive status including delirium or dementia; mood; communication including vision, hearing, and speech; mobility; balance; bowel function; bladder function; ability to carry out activities of daily living; nutrition; and social resources.	Frailty: score \geq 0.23	Available

ADL, activity of daily living; EFS, Edmonton Frail Scale; TFI, Tilburg Frailty Indicator; NA, non-available.

Test, should be utilized [19].

According to the Physical Activity Guidelines for Koreans Revised Edition, published by the Korea Health Promotion

Institute, older adults are encouraged to engage in moderate-intensity aerobic physical activities, such as walking for more than 2 hours and 30 minutes per week, or high-intensity

Table 2. Characteristics of the 3 Korean Comprehensive Geriatric Assessment tools

	Korean Brief Comprehensive Geriatric Assessment Questionnaire	Korean Comprehensive Assessment	
		Standard form	Short form
Form	-	Standard form	Short form
Year	2006	2013	2013
Time (min)	< 15	40–50	10–15
Number of items	32	49	28
Self-recording questionnaire	Chronic disease, medication Subjective health status, frailty Alcohol, smoking, physical activity - Urinary incontinence Weight loss - Fall 6 Questions (ADL 4 + IADL 2) GDS 5questions Depression Social support	Chronic disease, medication Subjective health status, frailty Alcohol, smoking, physical activity Quality of sleep Dysuresia Oral health Vaccination Fall and housing ADL, IADL Short-form GDS Basic information for elderly Social support	Chronic disease, medication Subjective health status, frailty Alcohol, smoking, physical activity Quality of sleep Dysuresia Oral health Vaccination Fall and housing 6 Questions (ADL 4 + IADL 2) GDS 5questions - Social support
Assessment of physical function	BMI Mental state: 3 word recall, digit forward and backward, time orientation Vision, hearing Upper extremity function Lower extremity: gait time, gait difficulty	Height, body weight MMSE-K Visual acuity, hearing test Upper extremity function Lower extremity function and balance	- Memory and recall: 3 word recall Hearing test - Lower extremity function and balance

ADL, activity of daily living; IADL, instrumental activity of daily living; GDS, geriatric depression screening scale; BMI, body mass index; MMSE-K, mini-mental state examination Korean version; -, not applicable.

aerobic physical activities for at least 1 hour and 15 minutes per week. It is recommended to practice for at least 10 minutes at a time, spreading it out over several days. Strength training should be performed at least twice a week, targeting all parts of the body, with 8-12 repetitions per set. After strength training, it is advised to rest the muscles for at least 1 day and gradually increase the weight or number of sets. Balance exercises aimed at preventing falls include Tai Chi, side-walks walking, heel walking, tiptoe walking, and standing up from a sitting position. Patients are advised to start with support bars initially and gradually transition to performing the exercises without support [1].

Park et al. [20] conducted a study aimed at assessing the condition of older individuals with frailty living at home, developing exercise programs tailored to frailty, and validating their effectiveness. The results of implementing a 6-week exercise program showed a significant reduction in depression among the participants. Although not statistically significant, an overall improvement in their physical condition was also observed [20].

Nutrition

The Shortened Version of the Mini Nutritional Assessment is a brief nutritional assessment tool that can be conducted in under 10 minutes in primary healthcare settings [21]. Older individuals with malnutrition should consume 1.5 g of protein per kilogram of body weight per day [22].

In Korea, the prevalence of vitamin D deficiency is substantial (86.8% in males and 93.3% in females) [23]. A meta-analysis showed that higher concentrations of vitamin D correlate with a reduced risk of frailty [24]. However, further research is warranted to determine whether vitamin D supplementation can have a positive effect on fractures, falls, muscle mass, strength, and balance in older adults. For patients with frailty having vitamin D deficiency, vitamin D supplementation is advisable [12].

Frailty syndrome

Oral frailty

The deterioration of oral health and subsequent malnutri-

tion among older individuals are recognized as significant risk factors for frailty [25]. In 2022, clinical practice guidelines for oral frailty in primary healthcare settings in Korea were released, and the key points are outlined below. Screening for oral frailty is recommended for individuals aged ≥ 65 years [26]. For seniors diagnosed with oral frailty, low-intensity exercises, salivary gland massage, and orofacial exercises should be considered [24]. For seniors experiencing oral dryness, prescribing saliva substitutes or recommending salivary gland massage to alleviate oral discomfort is advised. Routine dental check-ups for individuals aged ≥ 65 years are recommended to manage periodontal health, ensure denture maintenance, and address issues related to tooth decay [26].

Cognitive frailty

In patients diagnosed with frailty, cognitive function evaluation can be considered using the Korean Mini-Mental State Examination [12]. However, there is insufficient evidence that interventions for cognitive dysfunction can manage frailty [27].

Therefore, interventions focusing on controlling cardiovascular risk factors, nutritional supplementation, and exercise therapy are recommended [12].

Social frailty

Social frailty arises from various physical, psychological, and social deficiencies, such as hearing impairment, walking difficulties, living alone, and decreased social interactions [28]. Recently, there has been a growing emphasis on social frailty due to its potential to accelerate appetite loss, malnutrition, and physical decline [29]. Social frailty can be objectively assessed using tools such as the TFI or the Korean Version of the Lubben Social Network Scale [30,31]. Although research on interventions for social frailty is limited, efforts are being made to integrate social frailty aspects into existing frailty interventions. For instance, physical activity interventions may include participation in group exercise programs [12].

Fall

In patients with frailty, screening for falls (including fall history inquiry, gait, and balance assessment) is conducted while considering multifactorial fall risk assessment and interventions for fall prevention in high-risk individuals [12]. The falls prevention clinical practice guidelines developed by the Korean Society of Internal Medicine and the Korean Geriatrics Society recommend fall screening and multifactorial fall assessment for older patients visiting outpatient clinics.

Fall screening comprises the following two simple questions: (1) Have you experienced two or more falls in the past year? and (2) Do you have any problems with walking or maintaining balance? [32].

Monitoring

Frailty is not a static concept occurring at a specific point in time; therefore, regular assessment and monitoring are necessary [33]. Reassessing CGA and focusing on areas where deterioration is observed are recommended. Annual reassessment is advised for older adults with frailty aged ≥ 75 years or those with chronic illnesses [12].

Conclusion

Frailty, a dynamic and multifaceted condition, poses significant challenges to the health and well-being of aging populations, particularly in Korea. The high prevalence of frailty highlights the urgent need for comprehensive frailty assessment and management strategies. Individuals aged ≥ 65 years should undergo screening for frailty. Subsequently, they should receive focused interventions based on the CGA results. Regular monitoring and reassessment of the frailty status, especially in older adults aged ≥ 75 years or those with chronic illnesses, are crucial for guiding personalized interventions and optimizing health outcomes. By adopting a multifaceted approach encompassing medical, social, and functional aspects, effective frailty management can be achieved, promoting the health and well-being of older individuals in Korea and globally.

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