Diagnosis and Management of Frailty in Primary Health Care

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Disability in older adults has become a significant burden, both individually and socially, due to the rapidly aging population in Korea. It is important to manage both frailty and chronic diseases to delay disability. Frailty, which is considered to be a transition phase between healthy status and disability, is defined as a significant decline in functional reserves of multiple organ systems and the resultant extreme vulnerability to stressors, leading to a higher risk of adverse health-related outcomes. The frailty phenotype and frailty index are the most commonly used methods to diagnose frailty. Frailty is related to physical, psychological, cognitive, and social dysfunction, and is sometimes caused by chronic disease. Therefore, primary care providers are ideally situated to incorporate the concept of frailty into their practice, as they are champions in comprehensive care. Although the identification and treatment of frailty is not yet standard practice in primary care, primary care physicians must use the electronic frailty index to identify frailty in all the patients aged ≥65 years in the United Kingdom. In Canada, some insurance companies and governments are using a similar program, which is called the Community Actions and Resources Empowering Seniors model. The clinical practice guidelines of the International Conference of Frailty and Sarcopenia Research, as well as some additional references, will be introduced. Here, we review the current literature on how to diagnose and manage frailty in primary care.

Keywords: Frailty; Primary Health Care; Diagnosis; Management
INTRODUCTION

As the population of Korea is rapidly aging due to low fertility and a long-life span,3) comorbidities and disability of older adults have increased. Disability is linked to functional dependency on caregivers and results in significant long-term health care expenses. Health care expenditure for the older population has increased more rapidly than for younger adults.2) Although the development of medical science has succeeded in controlling many diseases, increasing lifespan, and delaying the onset of disability to some degree,3) it does not entirely reduce the disability burden in older age.

What else can help prevent or delay the onset of disability in the older population? To keep older adults functionally capable, it is imperative not just to treat those with comorbidities.3) Disability means severe functional impairments that result in assistance being required to accomplish basic activities of daily living. Contrastingly, frailty is considered to be an impairment in body function. Therefore, frailty is a transition phase between healthy or robust status and disability. Therefore, to delay the onset of disability, managing and preventing frailty is important.

Frailty becomes a more common health problem with age. The prevalence of frailty in community-dwelling older adults varies from 4.9% to 27.3% around the world4) and increases to 50% in those >80 years of age.3) As such, frailty is becoming increasingly important for physicians to consider when taking care of older patients. Here, we review how to diagnose and manage frailty in primary care.

FRAILTY: EXTENSION OF THE DISEASE MODEL TO FUNCTION CONCEPT

The World Health Organization (WHO) has defined healthy aging “as more than just the absence of disease, and the process of developing and maintaining the functional ability that enables wellbeing in older age irrespective disease.”6) Functional ability is about having the capability to carry out activities that people value. Functional ability is made up of the intrinsic capacity or functional reserve of the individual. Therefore, healthy aging is considered to occur even in individuals that have a chronic disease as long as they maintain daily functional ability. Contrastingly, if an older adult does not have a chronic disease but cannot maintain their daily functional ability, then this is considered not to be healthy aging. The WHO asserted that “frailty” is a risk against healthy aging.

Therefore, frailty interventions should focus on function, irrespective of comorbidities. Nowadays, practitioners are facing a paradigm shift from a disease to function model, with a move from organ-based medicine to functional medicine.7)

DEFINITION OF FRAILTY

Frailty is defined as a significant decline in functional reserve, resistance, and resilience of multiple organ systems, and the resultant extreme vulnerability of the individual to endogenous and exogenous stressors (like infection, injury or surgery, or some medicines), leading to a higher risk of accelerated functional decline and adverse health-related outcomes (Figure 1).8) Functional decline is usually caused by the interaction of progressive age-related changes in organs and pathologies of chronic diseases, consequently leading to decreased functional reserve capacities. The adverse health-related outcomes caused by frailty include falls, delirium, immobility or disability and consequently hospitalizations, institutionalization, and mortality.5-10)

Although any organ may show accelerated functional decline driven by a stressor, the skeletal muscles, and brain are the most common. Therefore, muscle weakness (sarcopenia) and delirium (or cognitive decline) are the most common presentations of frailty. Multi-organ interventions are important for the management of frailty.

DIAGNOSIS OF FRAILTY

The most common ways of diagnosing frailty are the phenotypic and deficit accumulation approaches.

1. Frailty Phenotype

The phenotypic approach, or Fried’s frailty phenotype, classifies a person as frail if three or more of the five frailty items are present. The five items are (1) slow walking speed, (2) impaired grip strength, (3) declining physical activity levels, (4) exhaustion, and (5) unintended weight loss. The presence of just one or two of the five items is defined as pre-frailty, and none of them indicates healthy or robust.11) The Fried frailty phenotype focuses on physical domains, and so it is recognized as the physical frailty phenotype. The cut-off values for grip strength and gait speed of the five components were suggested by Fried based on the Cardiovascular Health Study.11) Won et al.12) suggested criteria for frailty among Korean older adults based on data of Korean Frailty and Aging Cohort Study as follows (Table 1).13)

2. Frailty Index

The other approach to defining frailty is the frailty index (FI), which is a sum of health deficits. In FI, health deficits can be any physical or

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Figure 1. Concept of frailty and its vulnerability to stressors in terms of functional dependency. Modified from Clegg et al. Lancet 2013;381:752-62.4)
mental disability, symptom or sign, disease, or laboratory finding.\cite{14} The rationale for counting health deficits in FI is straightforward: the more health problems an individual has, the greater their risk of being frail and having adverse health outcomes. The index is often expressed as the number of deficits present divided by the total number of deficits considered. For example, if 40 deficits were considered, and 10 were present in a given person, that person’s FI would be 10/40 = 0.25. Therefore, FI ranges from 0 to 1, and the higher the FI score, the frailer the person is considered to be.

FI is sometimes calculated based on a comprehensive geriatric assessment (CGA). Frailty is related to physical, psychological, cognitive, sensory, and social dysfunction.\cite{15,16,17}

The standardized CGA used for the FI can comprise assessments in 10 standard domains: (1) cognitive status including delirium or dementia; (2) mood and motivation; (3) communication including vision, hearing, speech; (4) mobility; (5) balance; (6) bowel function; (7) bladder function; (8) instrumental activities of daily living and activities of daily livings; (9) nutrition; and (10) social resources.

Frailty is also known to be highly associated with hypertension, diabetes mellitus, cancer (other than minor skin cancers), chronic lung disease, heart attacks, congestive heart failure, angina, asthma, arthritis, stroke, and kidney disease.\cite{16,17}

If frailty is caused by any disease, it is sometimes called secondary frailty. Otherwise, it is called primary frailty. As shown in Figure 2, one-quarter to one-third of frailty cases are not associated with a comorbidity. Based on these principles, Theou et al.\cite{18} constructed FI with 56 variables that were chosen from a CGA adapted for use in primary care. Meanwhile, the author and colleagues recently developed and validated the Korean frailty index for primary care with 53 deficits.\cite{19} A comparison of the frailty phenotype and FI is summarized in Table 2.

![Figure 2](https://doi.org/10.4082/kjfm.20.0122)

**SCREENING FOR FRAILTY**

To diagnose frailty using the Fried frailty phenotype, gait speed and grip strength measurements, as well as an assessment of physical activity are required. FI takes a long time to complete. Therefore, simple screening questionnaires will be more useful in clinical practice.

1. FRAIL Questionnaire

The 5-item Fatigue, Resistance, Ambulation, Illnesses, & Loss of Weight (FRAIL) questionnaire has been well-validated worldwide.\cite{20} The FRAIL questionnaire adopted “illness” instead of physical inactivity of the Fried frailty phenotype. A Korean version of the FRAIL (K-FRAIL) scale was developed and validated. For differentiating prefrailty and frailty from robustness, the sensitivity and specificity of the K-FRAIL scale were 0.90 (95% confidence interval [CI], 0.76 to 0.97) and 0.33 (95% CI, 0.22 to 0.46), respectively.\cite{20}

2. Frailty Phenotype Questionnaire

Kim et al.\cite{21} developed a 5-item questionnaire (The Frailty Phenotype Questionnaire) to accurately screen for the Fried frailty phenotype. The new questionnaire showed satisfactory diagnostic accuracy for

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**Table 1. Five items of Fried’s frailty phenotype and its cutoff reference (suggested by Korean Frailty and Aging Cohort Study)**

| Item                          | Cutoff reference                                      |
|-------------------------------|-------------------------------------------------------|
| Unintentional weight loss     | Defined as a “yes” response to the question: “In the last year, have you lost more than 4.5 kg unintentionally?” |
| Weakness                      | Defined as the lower 20th percentile of grip stratified by sex and BMI quartiles based on the KFACS baseline survey. Men: BMI ≤ 22, ≤25.0 kg; BMI 22.1–24, ≤27.0 kg; BMI 24.1–26, ≤27.8 kg; BMI >26, ≤28.5 kg. Women: BMI ≤ 23, ≤16.8 kg; BMI 23.1–25, ≤17.7 kg; BMI 25.1–27, ≤17.8 kg; BMI >27, ≤17.7 kg |
| Self-reported exhaustion      | Defined as a “yes” response to either of the following statements from the Center for Epidemiological Studies-Depression scale on 3 or more days per week: “I felt that everything I did was an effort” and “I could not get going.” |
| Slowness                      | Walking speed over 4 m was measured using an automatic timer with acceleration and deceleration phases of 1.5 m. The lowest 20% of gait speed stratified by sex and height based on KFACS data was suggested as a cut-off. Men: height ≤ 165 cm, ≤0.93 m/s; height >165 cm, ≤0.98 m/s. Women: height ≤ 152 cm, ≤0.85 m/s; height >152 cm, ≤0.93 m/s |
| Low physical activity         | Energy expenditure estimates (kcal/wk) were calculated using the IPAQ and metabolic equivalent scores were derived from vigorous, moderate, and mild activities in the questionnaire. Low physical activity level was defined as ≤494.65 kcal for men and ≤283.50 kcal for women, corresponding to the lowest 20% of the total energy consumed in a population-based Korean survey of older adults from among the general population.\cite{15} |

BMI, body mass index; KFACS, Korean Frailty and Aging Cohort Study; IPAQ, International Physical Activity Questionnaire.
the Fried frailty phenotype (area under the curve=0.89) with a high sensitivity (81.7%) and specificity (82.5%).21) The Frailty Phenotype Questionnaire is presented in Table 3. As with the Fried frailty phenotype, those with a score of “0” in the Frailty Phenotype Questionnaire are considered to be robust, while those with a score of 1 or 2 are prefrail, and those with a score 3 or more are frail.

### ASSESSMENT AND MANAGEMENT OF FRAILTY IN PRIMARY CARE

Given that frailty is a common presentation in older adults, it is clear that family medicine and other primary care physicians must manage frailty.18) Primary care providers are ideally situated to incorporate the concept of frailty into their practice, as they are champions in comprehensive care. The role of primary care is crucial as family physicians can focus more on patient-oriented, comprehensive care, including biomedical and psychological care, as well as social support. Nonetheless, identification and treatment of frailty is not yet a standard practice in primary care.18) Recognizing frailty in primary care is hindered by its insidious onset and progression, our single-system disease model, and clinicians mistaking clinical frailty for normal aging.23)

#### 1. Assessment and Management of Frailty in Primary Care in the United Kingdom

Since 2017, the new General Medical Services contract in England mandates that all primary care practices use an appropriate tool to identify moderate or severe frailty for all patients aged ≥65 years.23) To identify people at risk of frailty, the electronic frailty index (eFI) was embedded in the electronic health record system. The eFI helps to screen for frailty, while the final diagnosis requiring the clinician’s judgment. The eFI consists of 36 items, and it takes about 5 minutes to complete (Table 4).24) For patients found to be severely frail, the practice must undertake a clinical review, provide an annual medication review, discuss whether the patient has fallen in the last 12 months, and provide any other clinically relevant interventions.24)

#### 2. Assessment and Management of Frailty in Primary Care in Canada

The Fraser Health Authority (British, Columbia, Canada) partnered with Nova Scotia Health Authority and a private sector organization (Shannex Inc., Nova Scotia, Canada), through the Canadian Foundation for Healthcare Improvement’s EXTRA program to design the Community Actions and Resources Empowering Seniors (CARES) model. CARES incorporates five strategies which are detailed below.24)
1) Early identification of “at-risk” seniors
Primary care providers (PCP) identify older people from the community who are at risk of frailty, based on their clinical judgment.

2) Collaborative health assessments
PCP and the care team evaluate the patient using a comprehensive geriatric assessment-based frailty index (FI-CGA) score to assess frailty levels.

3) Wellness plans
The summary of the CGA is shared with the patient to find out their health concerns and to aid in the creation of a wellness plan that identifies the patient’s goals for enhancing their health and quality of life. The domains encouraged are exercise, socialization, and nutrition. A referral to a community health coach can be made.

4) Coaching
Patients are paired with a free-of-charge, telephone-based health coach. Seniors receive over-the-phone health coaching to track their progress in achieving their goals. This can be in terms of exercise, chronic health-care issues management, and connections to resources in the community.

5) On-going assessments
At the end of 6 months, the CGA including the clinical frailty scale and FI-CGA is repeated. After 6 months of the CARES program, the average FI score of the participants decreased by 0.03 (11% decline), and 61% improved their FI-CGA score. These changes are significant, as it is expected that FI scores increase by 4.7% every year in older adults. At Fraser Health, the CGA is now embedded in the electronic medical records, allowing general practitioners who participate in CARES to easily access the FI-CGA scores of their patients.

EVIDENCE-BASED MANAGEMENT OF FRAILTY
There is significant evidence that suggests that frailty status might reverse to pre-frail and sometimes to a robust condition.25) Risk factors of frailty are older age, history of cancer, hospitalization events, chronic obstructive pulmonary disease, cerebrovascular disease, and osteoarthritis. Preventable factors of frailty are higher cognitive function, absence of diabetes, higher socioeconomic status, and history of cerebrovascular disease.9) Polypharmacy is also a significant risk factor for frailty.26) Frailty is not considered a disease, but rather a syndrome requiring a multidomain and multidisciplinary approach. Management of frailty requires a shift from single-disease care to holistic patient care.27)

The task force of the International Conference of Frailty and Sarcopenia Research developed clinical practice guidelines that give an overview of the current evidence-based management interventions for frailty in older adults. Some recommendations are referred to as below.27) In addition, some additional references have been added.

1. Development of a Comprehensive Management Plan
A comprehensive care plan for frailty should include polypharmacy, the management of sarcopenia, treatable causes of weight loss, and causes of exhaustion (depression, sleep apnea, anemia, hypotension, hypothyroidism, and vitamin B12 deficiency).27)

1) Clinical evaluation
Exhaustion may be the result of various comorbidities such as heart failure, and a clinical evaluation is needed to exclude other causes of exhaustion.

2) Avoidance of medication-related adverse events by reducing polypharmacy
The recently developed, frailty-specific STOPP recommendation (termed STOPPFrail), outlines 27 criteria regarding medications that

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Table 4. List of 36 deficits contained in the electronic frailty index in UK National Health Service

| List of 36 deficits |
|---------------------|
| Activity limitation |
| Anaemia and haematinic deficiency |
| Arthritis |
| Atrial fibrillation |
| Cerebrovascular disease |
| Chronic kidney disease |
| Diabetes |
| Dizziness |
| Dyspnoea |
| Falls |
| Foot problems |
| Frailty fracture |
| Hearing impairment |
| Heart failure |
| Heart valve disease |
| Housebound |
| Hypertension |
| Hypotension/syncope |
| Ischaemic heart disease |
| Memory and cognitive problems |
| Mobility and transfer problems |
| Osteoporosis |
| Parkinsonism and tremor |
| Peptic ulcer |
| Peripheral vascular disease |
| Polypharmacy |
| Requirement for care |
| Respiratory disease |
| Skin ulcer |
| Sleep disturbance |
| Social vulnerability |
| Thyroid disease |
| Urinary incontinence |
| Urinary system disease |
| Visual impairment |
| Weight loss and anorexia |

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are potentially inappropriate for older adults with frailty.28

3) Other strategies
All older persons with frailty should be assessed for visual and hearing difficulties. Those who are at risk of falling should be checked for orthostatic hypotension and syncope.

2. Physical Activity
Older people with frailty should be offered a multi-component physical activity program.27 Physical activity is the most feasible way to prevent and treat frailty. Some evidence has shown that multi-component physical activity programs (combining resistance-based training with aerobic and balance training) are the most effective at managing frailty in older adults. They help to improve muscle strength, balance, and disability, as well as reduce the risk of falls.29 Notably, group physical activity sessions were more likely to be successful in improving frailty than individual sessions according to a systematic review.30

A typical exercise regimen that may be proposed in general practice is: 20–25 minutes of activity, 4 days per week at home, comprising 15 exercises: three for strengthening arms, seven for strengthening legs, and five for balance and coordination. Each exercise should be repeated 10 times per minute, progressively reaching 15 times per minute after 2–3 months, with a rest of 30 seconds between each set.31

3. Nutrition and Oral Health
Protein/caloric supplementation can be considered for persons with frailty when weight loss or undernutrition is diagnosed.27 A Korean randomized controlled trial study showed that protein intake of 1.5 g/kg per day was the most beneficial for preventing frailty in older adults. They help to improve muscle strength, balance, and disability, as well as reduce the risk of falls.29 Notably, group physical activity sessions were more likely to be successful in improving frailty than individual sessions according to a systematic review.30

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4. All persons with frailty should be offered social support as needed to address unmet care needs27
Practitioners should remember that social isolation is a major risk factor for the progression of frailty in older adults.23 In Korea, contact with friends seems to be the most important social relationship to prevent frailty. Those contacting friends monthly or less were more likely to be frail compared to those in the daily contact group (adjusted odds ratio, 5.04; 95% CI, 2.29–11.08). Interestingly, contact with family was not found to be a significant preventing factor in the study.24

CONCLUSION
In conclusion, frailty is related to physical, psychological, cognitive, and social dysfunction. It is sometimes caused by chronic disease. Therefore, primary care providers are ideally situated to deal with frailty, as they are champions in comprehensive care. There is increasing global evidence for assessing and managing frailty in primary care. The frailty phenotype and FI are the most commonly used methods for identifying frailty. For frail older adults, a comprehensive care plan is needed and should aim to reduce polypharmacy and manage sarcopenia as well as other treatable causes. Older people with frailty should be offered a multi-component physical activity program that combines resistance-based training with aerobic and balance training. Protein/caloric supplementation can be considered for people with frailty when weight loss or undernutrition is diagnosed. A combination of strength exercises and protein supplementation has been found to be the most effective and easiest intervention to implement to delay or reverse frailty in primary care. All people with frailty should be offered social support to address unmet care needs.

CONFLICT OF INTEREST
No potential conflict of interest relevant to this article was reported.

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