

Prevention of the Frailty and Nursing

Abstract

Frailty is a condition in which physiological functions decrease with aging, and the body's ability to adapt to stressors is impaired due to insufficient reserves. It causes many undesirable problems in the individual and increases morbidity and mortality. It has become a growing problem with the aging of society. Teamwork and individualized comprehensive planning are essential to prevent frailty. Although it is difficult to prevent frailty, it is possible to reduce, at least delay it, when the risk factors are known. Nurses always encounter frail people because they work in all areas of healthcare services. They have important responsibilities in determining the people at risk, managing interchangeable risk factors, and educating frail people and their families. This review aimed to determine the current approaches and responsibilities of nurses in preventing frailty.

Keywords: *Frailty, Geriatric syndrome, Nursing, Prevention*

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Karahan A. Prevention of the Frailty and Nursing. *J Educ Res Nurs.* 2021; 18(3): 347–351

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Submitted: May 31, 2019
Accepted: September 10, 2019



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Introduction

Frailty is a condition that is most common in old age. Aging results from the impact of the accumulation of a wide variety of molecular and cellular damage over time and leads to a gradual decrease in physical and mental capacity, a growing risk of disease, and ultimately, death.¹ Similar to the rest of the world, the rate of elderly population to total population is gradually increasing in Turkey. While the elderly population constituted 9.3% of the world population in 2020,² the ratio of elderly population in the total population has increased to 9.1% as of 2019 in our country.³

Although some people remain relatively healthy and resilient with aging, others become more vulnerable to external and/or internal stressors, indicating a state of frailty.⁴ Frailty is one of the several complex health states that tend to occur only later in life and that do not fall into discrete disease categories. These are commonly called geriatric syndromes. They are often the consequence of multiple underlying factors and include frailty, urinary incontinence, falls, delirium and pressure ulcers.¹ As nurses encounter frail people in every setting they serve, knowing frailty helps them prevent the possible problems due to frailty and effectively manage the care process of frail people. This study reviewed the current literature to determine the current approaches in preventing frailty and the responsibilities of nurses.

Definition of Frailty

A clear definition of frailty is yet to come; it is often confused with sarcopenia. While sarcopenia is an important determinant of frailty, it does not equal frailty.⁵ Frailty is a multidimensional and dynamic condition because it covers many factors.⁶ It "is defined as a clinically recognizable state of increasing vulnerability resulting from aging-associated decline in reserve and functions across multiple physiologic systems, thus, compromising the ability to recover from endogenous and exogenous stressors".⁷ As it affects multiple physiological systems, frailty often poses a great risk for adverse health consequences such as disability, fracture, hospitalization, and death.⁸

Frailty can occur in two forms, physically and cognitively. Physical frailty manifests with decreased muscle strength, endurance, and physical functions, increases the individual's frailty, and consequently increases dependency and/or mortality. In cognitive frailty, there is no comorbid types of other dementia or Alzheimer's, and physical frailty and cognitive impairment occur spontaneously.⁷ Five components stand out in frail people. They include sarcopenia with weight loss, low physical activity, slowness, weakness, and exhaustion.⁸⁻¹⁰ Fried defines having two components out of five as prefrail and having three criteria as frailty.^{9,11}

Prevalence of Frailty

The prevalence of frailty varies by country. The meta-analysis by Siriwardhana et al.¹², found that, in studies using different methods of measurement, the prevalence of frailty varied from 3.9% (China) to 51.4% (Cuba) and the prevalence of prefrailty ranged from 13.4% (Tanzania) to 71.6% (Brazil). A study conducted in Australia with 592 participants aged 75 years and over found that frailty prevalence among the sample was 43.6%, with 46.3% prefrail and 10.1% not frail.¹³ Another study conducted in two nursing homes in Spain with 331 institutionalized adults older than 65 years found that 2.8% were non-frail, 28.4% were prefrail, and 68.8% were frail.¹⁴ The study examining the effects of psychosocial factors on frailty in Italy with 210 patients with a mean age of 73 determined that 31% were robust, 55% were

prefrail, and 14% were frail.¹⁵ The study conducted with 36,751 people in Israel and 13 European Countries reported frailty findings in 50% of people over the age of 70 years.¹⁶ In a systematic review examining the prevalence of frailty in Japan, the frailty was 7.4% and the prefrailty was 48.1%.¹⁷

According to one of the studies conducted in Turkey, the prevalence of frailty was 7.1% among 168 elderly adults from rural areas in Kars (mean age 72.7); in another study, 27.2% of 335 patients who applied to the geriatric outpatient clinic were robust, 46.6% were prefrail, and 26.3% were frail.^{18,19} The study by Özdemiş et al.²⁰ with 399 inpatients (mean age 71.9) in the internal medicine and geriatrics wards found that 8.3% were robust, 26.2% were prefrail, and 65.5% were frail. The mean age of people included in the sampling varied in these studies. However, the results of studies conducted in Turkey and other countries might indicate that the rate of frailty among patients monitored in geriatric clinics was higher than the rate in society.

Physiopathology of Frailty and Risk Factors

The pathophysiology and underlying mechanisms of frailty and aging are closely related and are not yet fully understood.⁸ It is thought that gradual damage, functional regression, and failure occur at the cell, tissue, and organ levels due to genetic, epigenetic, and environmental factors with aging. Catabolic changes occur in the musculoskeletal system with the activation of tissue necrosis factor alpha and pro-inflammatory cytokines such as interleukin I and II (IL-I, IL-II); losses occur in muscle mass and strength; malnutrition and weight loss occur when the elimination and absorption of nutrients are impaired. As a result of all this, metabolic effort and energy requirements increase to maintain homeostasis. In this case, the individual avoids activities requiring effort and slows down and his movements decrease. Due to the increasing inactivity, the individual experiences more serious problems; develops complications; dependence on others and need for care increases.^{8,11}

Many risk factors have been identified in relation to frailty. Factors such as age,^{21,22} gender,^{23,24} race,⁸ education,²⁵ income level,⁶ nutrition,²⁶ functional impairment,^{8,24} depression and cognitive decline,^{15,27} chronic diseases, number of comorbidities^{28,29} affect frailty.

Age

Frailty increases in parallel with increasing age. The physical and cognitive effects of aging accelerate frailty.²² The factors associated with frailty were examined in 486 elderly people who received home care services with a 3-year follow-up in South Korea. Participants were divided into young-old, middle-old, and old-old elderly. They were evaluated in terms of physical, functional, mental health, and frailty. Over the three years, young-old elderly lost an average of 1.42 kg and old-old elderly lost 2.18 kg. Based on their self-evaluation, both groups defined their health status as statistically significantly worse over time. In this study, the frailty score in young-old elderly increased from 3.67 to 4.51 in 1 year and 5.65 in the next year ($P < .05$) while, in old-old elderly, it increased from 5 to 6.34 in 1 year and 7.50 in the next year.²³

Gender and Race

Frailty is higher in women than men.^{8,23} However, mortality is higher in men. The study conducted by Zhang et al.²⁴ (2018) with 1953 elderly people found that the prevalence of frailty was 5.4% in males and 8.8% in females. Significant risk factors for geriatric frailty in females were obesity, physical inactivity, sleeping less than six hours, history of diabetes and heart attack, and hospitalization history; in males, they were being widowed/divorced/separated, low daily total calorie intake, physical inactivity, sleeping more than nine hours, smoking, and hospitalization history.²⁴ Frailty was higher in African Americans.^{8,23}

Education

Studies found that frailty was higher in people with a low education level. The low level of education meant low income, insufficient self-efficacy, and higher numbers of cognitive disorders and chronic diseases. These factors were reported to increase frailty.^{8,23,25}

Occupation

A review study examining the contribution of occupational factors on frailty in people aged 70 and over in China and France and people aged 60 and over in Latin America found that frailty was lower in the white-collar group compared to other occupational groups.⁶

Physical activity

Frailty is closely related to musculoskeletal health. The musculoskeletal function is quantitatively the most important component of frailty. Frailty is one of the factors most associated with age-related osteoporosis, fractures, falls, osteoarthritis, and spinal problems. Insufficient physical activity was found to be directly related to frailty. It is reported that preventing the occurrence of the first fracture was also effective in preventing frailty.^{8,24}

Malnutrition

Malnutrition and frailty are two geriatric syndromes that significantly affect the independent living and health in adults. A meta-analysis found that, in a population of 5447 people (mean age 77.2), 2.3% was characterized as malnourished and 19.1% as physically frail. The prevalence of malnutrition was significantly associated with the prevalence of physical frailty. However, 68% of the malnourished older adults was physically frail, whereas only 8.4% of the physically frail population was malnourished.²⁶

Psychosocial status

Frailty is associated with conditions such as depression and negative emotions. The study examining the effects of psychosocial factors on frailty in Italy found that frail people had higher levels of depression, feeling lonely, and social isolation compared to non-frail people, and people with low positive emotion scores had more frailty.¹⁵ A systematic review study examining the relationship between depression and frailty found that people with depression, cognitive impairment, or dementia have higher frailty.²⁷

Stress

Frail people are considered more susceptible to stressors as a result of decreased physiological reserve. There are many stressors including infection, disease, change in medication, and even mental stress. A fit older person exposed to a sudden change in health status returns to homeostasis, but for the frail person, a minor stressor generates an exaggerated shift in declining health status, resulting in a dependent state from which a complete recovery is not made.⁸

Comorbid diseases

Studies found that frailty was higher in those with cancer, heart failure, and end-stage renal disease than in the normal population.^{8,24,28,29}

Identifying and Preventing Frailty

It is important to consider the frailty criteria for determining frailty. Different measurement methods are used to determine frailty. According to Fried's five criteria, weakness is indicated by "grip strength," slowness is indicated by "time spent to walk a certain distance," physical activity is indicated by "Minnesota Leisure Time Activity Survey" and "weighted kilocalories expended per week," exhaustion is indicated by "self-reports of depression," and body weight is indicated by "more than 10% unintentional weight loss in the last year."⁹ There are also scales developed to determine frailty.^{21,30-37} Examples of

Table 1. Frailty Scales for Which Validity and Reliability Studies are Conducted for Turkey

Name of the Scale	Developer(s)	Number of Items	Domains	Researcher(s) Studying Validity/Reliability for Turkey and Date
Edmonton Frailty Scale	Rolfson et al. ³¹	11 items	9 domains	Aygör et al. ³²
PRISMA-7	Raiche et al. ³³	7 Items	With yes/no options	Yaman and Ünal ³⁴
Tilburg Frailty Scale	Gobbens et al. ²¹	25 Items	3 domains	Arslan et al. ³⁵
Groningen Frailty Indicator	Peters et al. ³⁶	15 items	8 domains	Aygör et al. ³⁷

commonly used scales include Edmonton Frailty Scale, Tilburg Frailty Scale, PRISMA-7, Groningen Frailty Indicator, and FRAIL Questionnaire. The last one, FRAIL (Fatigue, Resistance, Ambulation, Illnesses, Loss of weight), is a scale that can provide simple and rapid assessment in primary care settings and consists of the criteria regarding fatigue, resistance, ambulation, illness, and weight loss components.³⁰ Table 1 summarizes the other studies on those scales and tools (Table 1).

It is important to prevent frailty rather than its early detection and, if not, to delay it as much as possible. A holistic and multidisciplinary approach is of great importance in preventing frailty. It is recommended to screen the frail people in the society and to intervene and educate them before hospitalization. Nurses should be aware of the people at a high risk of frailty, apply up-to-date and evidence-based practices to prevent frailty, and educate patients and their relatives accordingly.³⁸ The most emphasized issues in the prevention of frailty are explained below as “maximizing the control of chronic diseases and avoiding multiple drug use,” “increasing physical activity and exercising,” “diet/nutrition,” “strengthening social life, group meeting, health education, and cognitive support.”

Maximizing the Control of Chronic Diseases and Avoiding Multiple Drug Use

For preventing frailty, modifiable risk factors should be taken into account, a comprehensive assessment should be made, and an individualized care plan should be established. Accordingly, the control of chronic diseases should be ensured and polypharmacy should be reduced.³⁹ It was reported that evidence-based medication review checklists can be used for this purpose and that only those that have priority and necessity for the individual should be given.³⁸

Increasing physical activity and exercising Studies showed that preserving muscle mass, maximizing muscle strength, maintaining musculoskeletal function, maintaining balance, and increasing mobility were useful in preventing fractures and protecting mental health and cognitive functions. While studies regarding the prevention of falls through exercise were far from conclusive, they emphasized that interventions combining diet and at least three months of exercise to increase balance, functional ability, and muscle strength were effective in reducing frailty.^{8,40} There are contradictory results regarding which exercise is effective for preventing frailty and what its duration and frequency

should be. Tai Chi was confirmed as useful for reducing falls risk but resistance training and computerized balance training was not.⁴¹

Diet/nutrition

There is conflicting information about what to eat to prevent frailty. However, studies showed that certain nutrients were beneficial in the prevention and treatment of frailty. Carbohydrate and protein-based diet are recommended especially for weight gain,^{8,40} while it was also stated that the Mediterranean diet can reduce frailty. A study conducted with 4421 people (mean age 61.2) found that frailty was lower in those who adhered to the Mediterranean diet (0.8%) than those who did not (1.5%) ($P < .05$).^{42,43}

It is emphasized that low intakes of specific micronutrients can increase frailty.⁴⁰ According to several studies, vitamin E deficiency is associated with cognitive impairments and decreased lower extremity muscle strength; decrease in vitamin B12 causes decreased energy metabolism; low levels of carotenoids (found in foods containing orange pigment such as carrots) cause a decrease in grip strength, hip flexion, knee extension, and walking speed; Vitamin D is essential in physiological processes such as immune system, bone metabolism, cognitive function, neurological function, muscle strength, and so its adequate consumption contributes to the prevention of frailty. In addition, inadequate intake of micronutrients such as vitamin C, vitamin B6, and cobalt is associated with frailty.^{44,45} Receiving a prebiotic product such as artichoke, chicory, beans, chickpeas, wheat, barley, rye, onion, garlic, banana, asparagus, and leek improved certain aspects of frailty (exhaustion, muscle strength) but not others (weight loss, walking speed, physical activity).^{41,46}

Group meetings, cognitive approaches, and health education

Group meetings and health education had little effect on reducing frailty, and interventions with exercise and nutrition were more effective.⁴⁰ According to a study, home visits by nurses and other healthcare staff were effective, especially with the increased number of visits and alert buttons but no difference occurred when visits were discontinued, and further studies were needed. Interventions such as increasing day-to-day coping, memory, problem-solving abilities and attention, and game activity programs reduced frailty when they were combined with interventions such as healthy diet and exercise, but other psychological interventions did not affect frailty.⁴¹ In the randomized controlled trial by Chan et al.⁴⁷, conducted with 289 people of 65-79 years of age, one group received two hours of training on frailty, sarcopenia, coping strategy, nutrition, and exercise program. In addition to this training, the other group received six sessions of problem-solving therapy and 48 sessions of exercise program in 6 months. Both groups were followed up at the 3rd, 6th, and 12th months. While both groups had a statistically significant improvement in the state of sarcopenia and frailty, it was found that the improvement was greater in the group that received the intensive program.

Nurses' responsibilities in preventing and managing frailty

Nurses encounter frail people more and more, particularly with the aging of society. They are responsible for planning and carrying out the care of frail people or those at risk of frailty at every stage of health care, starting from primary care services.³⁹ Nurses should plan and implement appropriate interventions with a holistic approach as part of a multidisciplinary team to prevent, reduce, or delay frailty and its negative consequences. Care strategies should be aimed at maintaining this homeostatic balance.⁴⁸

Emphasizing the importance of supportive care for frail people, it is recommended to plan interventions that include preventive, life-prolonging, rehabilitative, and palliative measures in varying proportion and intensity based on the individual patient's needs. Nurses should master the concept of frailty, identify individuals at risk of frailty, measure the level of frailty, take the necessary precautions, and perform interventions using current and evidence-based information for these individuals. Care for the frail people includes meeting the fundamental aspects of care such as physical function, symptom control, pain management, managing side effects, patient comfort, hydration/nutrition; communicating with patients and families including information provision, psychological support, emotional support, and cultural support; engaging patients and families in plans, shared decision-making, increasing the quality of life, and self-management.⁴⁹

In addition to the above-mentioned interventions and measures, other major interventions that nurses should include in their care are assessing nutritional status, preventing and rehabilitating falls, determining appropriate strategies for multidrug use, increasing medication adherence, providing risk management and other interventions for patient safety, ensuring the integration of home, hospital, rehabilitation, or palliative care institutions, and providing education.^{39,48-51}

Conclusion

Frailty has become an important problem with the aging of society. Increased frailty can lead to serious complications by creating a vicious circle for the individual and increase the need for care and mortality. Therefore, it is necessary to have effective integrated programs based on teamwork, including interventions such as education, exercise, and diet/nutrition to prevent and reduce frailty. In this context, nurses have crucial responsibilities in preventing and reducing frailty together with the other members of the team.

Peer-review: Externally peer-reviewed.

Financial Disclosure: The author declared that this study has received no financial support.

Conflict of Interest: The author has no conflict of interest to declare.

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