

Starting Construction of Frailty Cohort for Elderly and Intervention Study

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A research project, the "Construction of Frailty Cohort for Elderly and Intervention Study," funded by the Ministry of Health and Welfare, has been ongoing since December 2015. The Korean Frailty and Aging Cohort Study (KFACS) aims to identify risk factors for adverse outcomes associated with frailty in community-dwelling older adults, as well as means of prevention. KFACS is a multicenter, longitudinal study, with the baseline survey being conducted in 2016-2017. The sample (n=3,000) consists of those aged 70-84 years, stratified by age and gender, recruited from urban and rural regions nationwide. An in-person interview and health examination are performed every 2 years. This project is also conducting many intervention studies. Project interventions focus on nutrition and exercise. The nutritional intervention study compares the effects of 1.2 g/kg versus 1.5 g/kg daily protein intake on sarcopenia and frailty in older Koreans. The exercise trial examines the effectiveness of an information and communication technology-based program in preventing or reducing frailty.

Key Words: Frailty, Cohort, Intervention, Nutrition, Exercise

INTRODUCTION

Korea has a rapidly aging population. In 2000, the elderly accounted for 7% of the total, with an expected increase to 14% by 2019¹. The increase in the elderly population is reflected in rising medical expenditures, and places a strain on health insurance financing^{1,2}.

With population aging, more elderly people become frail and many become dependent or bedridden. Frailty is a state in which systemic functional capacity falls below a certain level. Susceptible individuals are vulnerable to a variety of stresses, resulting in development of various diseases, falls, impaired activities of daily living, disability, hospitalization, and death³. Much effort has been made to characterize the natural progression from vigor to a pre-frail state and frailty,

as well as to identify intervention measures to prevent or overcome frailty³. Therefore, a long-term prospective cohort study focusing on frailty and based on a large nationwide sample is needed to identify preventive and control measures in Korea.

NEEDS OF FRAILTY COHORT

Similar cohort studies are ongoing in Korea, but none are focused on frailty.

The disease-centered Korean Urban Rural Elderly study (KURE) study is funded by the Korea Centers for Disease Control and Prevention, and focuses on the prevalence and epidemiologic attributes of major geriatric diseases, such as hypertension and diabetes mellitus, but not frailty. The KURE study is recruiting subjects from Seoul and Gyeonggi province⁴.

The Anseong and Ansan cohorts represent a regional population emphasizing on chronic diseases such as diabetes mellitus and hypertension, but not frailty. The Anseong and Ansan cohort study initially targeted a population aged 40–69 years old⁵.

In addition to a cohort study, intervention studies on frailty with focus on exercise, nutrition, and social networks are also needed. For example, although evidence suggests that muscle strengthening exercise is effective for the prevention of frailty, exercise may not be an appropriate intervention for the frail elderly, as the ongoing benefit would end with termination of the intervention⁶. Therefore, a study is needed to identify physical activities and behavioral factors associated with a beneficial effect on frailty.

The effect of nutritional supplementation on frailty in the community-dwelling elderly and the appropriate amount of protein intake require clarification.

Our research team started a 5-year research project in December 2015, the “Construction of Frailty Cohort for Elderly and Intervention Study”, funded by the Ministry of Health and Welfare (Fig. 1).

Korean Frailty and Aging Cohort Study (KFACS) and Intervention Study

The Korean Frailty and Aging Cohort Study (KFACS) aims to identify risk factors and adverse outcomes of frailty in community-dwelling older adults, as well as means of prevention (Table 1). KFACS is a multicenter, longitudinal study, with the baseline survey being conducted in 2016–2017. The sample (n=3,000) consists of those aged 70–84 years, stratified by age and gender, recruited from urban and rural regions

nationwide. An in-person interview and health examination are performed every 2 years. The interview survey assesses factors associated with health status (comorbidity, polypharmacy, general healthcare and long-term care utilization, health literacy, health-related quality of life, depressive symptoms, sleep, and falls), health behaviors (smoking, alcohol consumption, physical activity, nutritional assessment, dietary patterns, food security), social functioning (social networks, social capital, social support), cognitive function (general cognition, frontal lobe function, memory, attention), and demographic and socioeconomic indicators. The health examination includes anthropometry (body weight, height, leg length, head circumference, waist circumference, upper arm, and calf circumference), vital signs, vision and hearing assessment, blood and urine testing (hematology, biochemistry, metabolic and endocrine parameters, inflammatory markers, and genetic assessment), electrocardiography, chest X-ray, dual energy X-ray absorptiometry, panoramic dental X-ray, and physical performance tests (hand-grip strength, short physical performance battery, and timed up and go test). This cohort study was approved by the Institutional Review Board of each center.

Another aim of this project is to develop a Korean frailty assessment tool that will be validated through the prospective cohort study. To finalize the Korean version, we included previously validated Korean and international frailty assessment tools in the survey for this cohort study. These included the Cardiovascular Health Study Frailty Index⁷, the Korean Longitudinal Study on Health and Aging Frailty Index⁸, the Korean version of the Fatigue, Resistance, Ambulation, Illnesses, and Loss of weight scale⁹, the Korean Frailty Index¹⁰, and the Frailty Instrument¹¹.

One aim of the project is the development of a 3-axis accelerometer-based wearable gait analysis system for frailty prevention. The accelerometer will be used to develop a fall- and frailty risk evaluation algorithm.

Project interventions focus on nutrition and exercise. One intervention study compares the effects of 1.2 g/kg versus 1.5 g/kg daily protein intake on sarcopenia and frailty in older Koreans.

Another exercise intervention trial is designed to evaluate the feasibility and effectiveness of an easily administered information and communication technology (ICT)-based physical activity system, using 3 mobile accelerometers to measure physical activity level and pattern and obtain feedback from subjects, in order to identify measures for frailty prevention in community-dwelling older Koreans.

Regular physical activity appears to be helpful in the prevention of sarcopenia¹² and other geriatric ailments¹³, and an exercise program that is specially designed and structured can help improve muscle strength and balance in older people, as well as reduce functional decline¹⁴.

However, the fact that older people have less social support

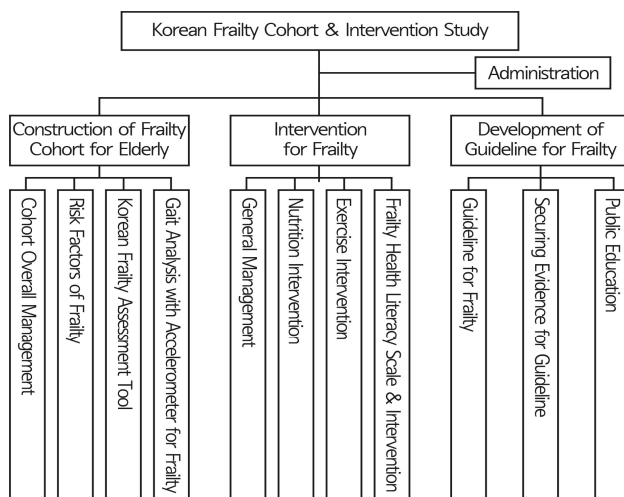


Fig. 1. Flow-chart of the Construction of Frailty Cohort for Elderly and Intervention Study.

Table 1. Goal of the project: Construction of Frailty Cohort for Elderly and Intervention Study

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- Develop and track a cohort survey on frailty in the elderly
 - Target 3,000 community-dwelling elderly aged 70 or older
 - Identify risk factors for frailty
 - Investigate risk factors for frailty
 - Develop outcome prediction models (disability, hospitalization, etc.) for frailty
 - Develop and validate a Korean frailty assessment tool
 - Develop integrative intervention skills and effectiveness verification for the frail elderly
 - Develop a cohort-based rationale for frailty management technology
 - Develop comprehensive assessment and integrated intervention skills
 - Verify effectiveness of frailty management through clinical research on intervention techniques
 - Develop standard guidelines for prevention and management of frailty in the elderly
 - Develop guidelines for the prevention and management of frailty
 - Establish a scientific basis for policy development
 - Educate the public and analyze the effectiveness of education
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and capability, as well as more comorbidity and depression, is associated with specific health conditions linked to decreased exercise. Many studies have reported declining exercise participation in older people. ICT can facilitate easier communication with older people by overcoming physical and societal differences. ICT systems also can be used for social support, risk screening, auto-reminders, and individual feedback. The evidence for the role of ICT-based health interventions in behavioral change continues to grow¹⁵.

The project also conducts subcohort studies. A nutrition subcohort study will examine food and nutrient intake, dietary behavior, and environmental factors in order to identify contributors to frailty, and will eventually define a Korean dietary pattern to aid in frailty prevention. Another subcohort study aims to identify social determinants of frailty and disability through monthly telephone interviews.

This cohort study has both strengths and weaknesses. Interviews and measurements at 10 centers throughout Korea may increase the representation of the general population, but may also cause difficulty with standardization of data.

Another intervention study in development is the Frailty (Health) Literacy scale and intervention program. The position of the World Health Organization and US Department of Health and Human Services is that health literacy is one of the most important factors determining overall health and can be a critical factor in health inequity¹⁶. Limited health literacy leads to a cascade of poor health outcomes, including a lower likelihood of receiving preventive care, more hospitalization, and worse health status, especially among older adults¹⁷.

Finally, the research team will produce frailty management guidelines for diagnosis, intervention, and improvement of prognosis.

The project team has established an internet website (www.kfacs.kr) to promote knowledge about frailty to the general public and to disclose structure and content of this research project.

CONCLUSION

A research project, the Construction of Frailty Cohort for Elderly and Intervention Study, funded by the Ministry of Health, Korea, has been ongoing since December 2015. The KFACS aims to identify risk factors for adverse outcomes associated with frailty in community-dwelling older adults, as well as means of prevention. KFACS is a multicenter, longitudinal study, with the baseline survey being conducted in 2016–2017. We anticipate learning how to decrease institutionalization and increase the quality of life through this cohort study. This project is also conducting many interventional studies. Project interventions focus on nutrition and exercise. The nutrition intervention study carries out clinical trial on the effects of 1.2 g/kg versus 1.5 g/kg daily protein intake on sarcopenia and frailty in older Koreans. The exercise trial examines the benefit of an ICT-based program for preventing or reducing the level of frailty.

Conflict of Interest Disclosures: The researchers claim no conflicts of interest.

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