

Toward a longevity diet framework: integrating global evidence for healthy aging in the South Korean population

Soyoung Jung¹, Hae Jin Kang¹, Mijoo Choi², Yoo Kyoung Park¹

¹Department of Medical Nutrition, AgeTech-Service Convergence Major, Kyung Hee University, Yongin, Korea

²Department of Food and Nutrition, Kyungnam University, Masan, Korea

Objective: As global life expectancy rises, the focus has shifted from longevity alone to healthy aging. Although dietary models such as the Mediterranean, Dietary Approaches to Stop Hypertension (DASH), Mediterranean-DASH Intervention for Neurodegenerative Delay, and EAT-Lancet diets show benefits for specific health outcomes, their direct application to South Korean populations is limited by differences in dietary patterns and cultural practices. This study aimed to develop nutritional criteria for a South Korean-adapted longevity diet framework.

Methods: A multiphase development approach was used, including a narrative review of major dietary models and clinical nutrition guidelines to identify key components of a longevity diet. Macronutrient distribution, food group intake, and nutrient-specific recommendations were synthesized into a structured framework. The EAT-Lancet reference diet was adjusted from 2,400 to 2,000 kcal/day to reflect energy requirements of South Korean adults.

Results: The proposed framework comprises six domain-specific recommendations, including macronutrient targets of 50%–65% carbohydrates, 10%–20% protein, and 15%–30% fat, with a 1:1 animal to plant protein ratio. Food group recommendations were tailored to South Korean dietary patterns. The framework addresses weight management, glycemic control, cardiovascular health, cognitive function, muscle function, and skin health. It emphasizes whole grains, dietary fiber, plant-based proteins, and unsaturated fats, while limiting refined carbohydrates, added sugars, and saturated fats.

Conclusion: This study presents evidence-based nutritional criteria for a South Korean-adapted longevity diet framework that integrates disease prevention with functional health support to promote healthy aging.

Keywords: Healthy aging; Longevity; Korean diet; Dietary patterns; Chronic disease

INTRODUCTION

With increasing life expectancy, population aging has emerged as a major public health challenge due to the rising burden of chronic diseases, functional decline, and healthcare costs [1]. Accord-

ingly, the focus has shifted from longevity alone to healthspan, defined as the ability to maintain independence and remain free from disease, driving growing interest in healthy aging [1]. Healthy aging is a multidimensional concept encompassing physical and cognitive function, metabolic health, and quality of life,

Received: April 9, 2026 **Accepted:** April 20, 2026

Correspondence to: Yoo Kyoung Park

Department of Medical Nutrition, Graduate School of East-West Medical Science, Kyung Hee University, 1732 Deogyong-daero, Giheung-gu, Yongin 17104, Korea

Email: ypark@khu.ac.kr

and it requires the management of multiple lifestyle factors [2].

Among these, diet is a key determinant of aging and overall health. Recent research has shifted from individual nutrients to dietary patterns, reflecting the complexity of real-world eating behaviors [3,4]. Such patterns are strongly associated with long-term health outcomes, and greater dietary diversity, combined with healthy lifestyle behaviors, has been linked to reduced mortality and increased longevity [3]. These findings suggest that healthy dietary patterns may simultaneously influence age-related physiological changes and the risk of chronic disease.

Several evidence-based dietary models have been developed to promote healthy eating patterns, including the Mediterranean diet [5], the Dietary Approaches to Stop Hypertension (DASH) diet [5], the Mediterranean-DASH Intervention for Neurodegenerative Delay (MIND) diet [6], and the *EAT-Lancet* diet. The Mediterranean and DASH diets are associated with cardiovascular disease prevention and blood pressure control, whereas the MIND diet primarily targets cognitive decline. The *EAT-Lancet* diet integrates human health with environmental sustainability, emphasizing plant-based foods within a structured framework [7,8].

However, most of these models are based on Western dietary patterns or global averages and may not adequately reflect the dietary habits, food composition, cooking practices, and nutritional characteristics of the South Korean population [9]. The traditional South Korean diet is characterized by a high intake of carbohydrates from grains and substantial consumption of vegetables and fermented foods, while protein and fat intake patterns differ from those of Western diets. Therefore, adaptation of existing dietary models to better align with South Korean dietary culture is warranted [10].

For example, the *EAT-Lancet* diet is based on a global reference intake of approximately 2,400 kcal/day, reflecting average energy requirements of adults. However, this benchmark may not be directly applicable to the South Korean population, where energy intake varies by sex, ranging from approximately 1,500 to 2,700 kcal/day, with an overall average of about 2,000 kcal/day based on the Korea National Health and Nutrition Examination Survey. This level aligns with the estimated average energy requirement in the 2025 Dietary Reference Intakes for Koreans, highlighting the need to contextualize global dietary models within the South Korean setting [11]. Accordingly, adjusting energy targets (e.g., to 2,000 kcal/day) and redefining food group recommendations to reflect a South Korean-style dietary pattern are necessary.

Therefore, this study aimed to develop evidence-based nutritional recommendations through a structured narrative review

and an adaptation process.

METHODS

This study used a methodological research design to develop structured nutrition management recommendations through a narrative review. Existing dietary models and clinical nutrition guidelines were systematically examined to inform a comprehensive dietary approach for healthy aging. The study focused on the development phase only; internal or external expert validation and effectiveness testing were not performed and are proposed for future research. Accordingly, the proposed framework should be interpreted as a conceptual model rather than a validated clinical guideline.

Ethics statement

This study did not involve human participants or animal subjects and was based on a review of publicly available literature; therefore, institutional review board approval was not required.

Development of nutrition recommendations based on key health domains

Nutrition recommendations were developed across key health domains, including weight management, glycemic control, cardiovascular health, cognitive function, muscle function, and skin health. These domains were selected for their relevance to frailty and healthy aging and are consistently recognized as major determinants of morbidity and mortality in older adults [12,13]. Domain-specific recommendations were informed by established dietary models, including the Mediterranean, DASH, and MIND diets, which address cardiovascular, metabolic, and cognitive health [5,6,14]. Muscle function was included due to its strong association with sarcopenia, a key component of frailty linked to functional decline and increased health risk [15]. Skin function was incorporated as an emerging indicator of aging, reflecting cumulative effects of oxidative stress, systemic inflammation, and tissue degeneration, and serving as a visible marker of biological aging associated with nutritional status [16,17].

Literature review and selection criteria

A comprehensive review of domestic and international literature was conducted to identify dietary patterns associated with healthy aging and chronic disease prevention. Relevant studies were retrieved from major databases (e.g., PubMed and Google Scholar) through December 2025 using keywords such as “healthy aging,”

“diet,” and “dietary patterns.” Dietary models were selected based on strength of evidence, clinical applicability, and relevance to aging populations, including the Mediterranean, DASH, MIND, and EAT-*Lancet* diets. In addition, clinical nutrition guidelines and position statements from relevant academic societies were reviewed to address key health concerns and physiological changes associated with aging.

Derivation and integration of dietary components

Key components, including macronutrient composition, food group intake, and dietary principles, were extracted from the selected models. Shared and complementary elements were identified and synthesized to establish unified dietary criteria. In this process, key health domains such as cardiovascular health, cognitive function, and physiological maintenance were considered. The criteria were then adapted to reflect South Korean dietary patterns, food availability, and cultural practices.

Energy adjustment and dietary adaptation

The EAT-*Lancet* reference diet, originally based on a 2,400 kcal/day intake, was used as the baseline model. Nutritional targets were proportionally adjusted to approximately 2,000 kcal/day, reflecting both the estimated average energy requirement in the 2025 Dietary Reference Intakes for Koreans and mean energy intake reported in the Korea National Health and Nutrition Examination Survey. Protein intake was adjusted in accordance with clinical nutrition standards and the food exchange system to ensure adequate intake and a balanced distribution of animal and plant protein sources.

Establishment of nutritional criteria

Nutritional criteria were established based on macronutrient distribution, protein quality, and food group-specific intake levels. Evidence from dietary models, clinical guidelines, and epidemiological studies was integrated to define recommended intake ranges for each food group. Particular emphasis was placed on dietary quality, prioritizing whole grains, dietary fiber, plant-based protein sources, and unsaturated fats, while limiting refined carbohydrates, added sugars, and saturated and trans fats.

RESULTS

Core nutritional criteria of the longevity diet framework

The core nutritional criteria of the longevity diet framework are

presented in Table 1. The proposed model integrates elements of the MIND and EAT-*Lancet* diets to provide a comprehensive approach to healthy aging. Total energy intake was set at 2,000 kcal/day, reflecting the average energy requirements of South Korean adults. Macronutrient distribution was defined as 50%–65% of total energy from carbohydrates, 10%–20% from protein, and 15%–30% from fat, with these ranges selected to ensure nutritional adequacy and metabolic balance. For protein quality, a balanced intake of animal and plant sources was recommended, with a target 1:1 ratio to support dietary diversity and sustainability. Overall, the proposed criteria emphasize balanced macronutrient distribution and integration of evidence-based dietary patterns to support healthy aging.

Comparison with existing dietary frameworks

The comparison of major dietary frameworks related to healthy aging is presented in Table 2. The Mediterranean, DASH, MIND, and EAT-*Lancet* diets have been widely studied across populations, each with distinct primary targets and health outcomes. The Mediterranean diet is associated with cardiovascular health and longevity in general adult populations, whereas the DASH diet focuses on hypertension and cardiovascular disease prevention. The MIND diet primarily targets cognitive health and has been shown to reduce the risk of cognitive decline. In contrast, the EAT-*Lancet* diet provides a globally standardized model integrating human health and environmental sustainability. The longevity diet framework proposed in this study differs from existing models by specifically targeting South Korean middle-aged and older adults and integrating multiple health domains, including weight management, glycemic control, cardiovascular health, cognitive

Table 1. Core nutritional criteria of the longevity diet framework

| Category | Variable | Recommendation |
|------------------------------|---------------------|---|
| Dietary model | Dietary pattern | Mediterranean, DASH, MIND, and EAT- <i>Lancet</i> |
| Energy | Total energy intake | 2,000 kcal/day |
| Macronutrients ^{a)} | Carbohydrate | 50%–65% of total energy |
| | Protein | 10%–20% of total energy |
| | Fat | 15%–30% of total energy |
| Protein quality | Source ratio | Animal protein/plant protein=1:1 |

Values are presented as percentages of total energy intake unless otherwise indicated. The diet was developed by integrating elements of the MIND and EAT-*Lancet* diets.

DASH, Dietary Approaches to Stop Hypertension; MIND, Mediterranean-DASH Intervention for Neurodegenerative Delay.

^{a)}Macronutrient distribution ranges were determined based on the 2025 Dietary Reference Intakes for Koreans.

Table 2. Comparison of major dietary frameworks related to healthy aging and the longevity diet framework proposed in the present study

| Feature | Mediterranean diet | DASH diet | MIND diet | EAT-Lancet (2025) | Longevity diet framework (present study) |
|---------------------------------------|---------------------------------------|--|---|---|--|
| Origin and primary target | | | | | |
| Primary target population | General adults (Mediterranean region) | Hypertension, CVD | Cognitive decline and Alzheimer disease | Global adult population | Korean middle-aged and older adults |
| Primary health outcomes | CVD, longevity | Blood pressure and CVD | Cognitive decline | Planetary health, sustainability, and justice | Healthy aging; six key health management domains |
| Evidence base | Prospective cohort, RCTs | RCTs (DASH trial) | Prospective cohort (MIND trial) | Systematic review and meta-analysis | Systematic review; clinical guidelines |
| Energy and macronutrient distribution | | | | | |
| Energy reference (kcal/day) | Not specified | Approximately 2,000–2,600 | Not specified | 2,400 | 2,000 Korean adults |
| Macronutrient ratio specified | Partially addressed | Partially addressed | Not specified | Not specified (food-based pattern) | ✓ |
| Carbohydrate (% of energy) | Not specified | Not specified | Not specified | Not specified | 50%–65% |
| Protein (% of energy) | Not specified | Not specified | Not specified | Not specified | 10%–20% |
| Fat (% of energy) | Not specified | Not specified | Not specified | Not specified | 15%–30% |
| Food group emphasis | | | | | |
| Whole grains | ✓ | 6–8 Servings/day | ≥3 Servings/day | 210 g/day (20%–50% of daily energy intake) | 33–89 g/meal |
| Vegetables and fruits | ✓ | 4–5 Servings/day each | Green leafy ≥6/wk | 300 g/day (200–600 g/day) | 55–160 g/meal |
| Legumes | ✓ | 4–5 Servings/wk | ≥3 Servings/wk | 75 g/day (0–150 g/day) | ✓ |
| Nuts and seeds | ✓ | ✓ | ≥5 Servings/wk | 50 g/day (0–75 g/day) | 0–20 g/meal |
| Fish | ✓ | ✓ | ≥1 Serving/wk | 30 g/day (0–100 g/day) | 50 g/meal |
| Dairy | Low-fat | Low-fat; 2–3 servings/day | Not addressed | 250 g/day (0–500 g/day) | 0–133 g/meal (low-fat) |
| Red and processed meat | Limited | Limited | <4 Servings/wk | 15 g/day (0–30 g/day) | Limited |
| Olive oil/unsaturated fat | Primary fat source | 2–3 Servings/day (fats and oils) | Olive oil is preferred | 40 g/day (20–80 g/day) | ✓ |
| Nutrient-specific guidance | | | | | |
| Saturated fat restriction | ✓ | Low (reduced saturated and trans fat intake) | ✓ | Not explicitly specified | ✓ |
| Sodium restriction | Moderate | ≤2,300 mg/day (≤1,500 mg/day optional) | Not specified | <2,000 mg/day | ≤2,300 mg/day (≤1,500 mg/day for CVD/HTN) |
| Dietary fiber | ✓ | ✓ | Not specified | Not specified | ✓ |
| Omega-3 fatty acids | ✓ | Partially addressed | ✓ | Partially addressed | ✓ |
| Antioxidant micronutrients | ✓ | ✓ | ✓ | Partially addressed | ✓ |

Most foods are assumed to be unprocessed or minimally processed. Individual optimal energy intake for healthy aging and maintenance of physiological and cognitive function may vary depending on body size, physical activity level, and physiological status.

DASH, Dietary Approaches to Stop Hypertension; MIND, Mediterranean-DASH Intervention for Neurodegenerative Delay; CVD, cardiovascular disease; RCT, randomized controlled trial; HTN, hypertension; ✓, fully addressed or emphasized.

function, muscle health, and skin health. In terms of dietary structure, previous models generally provide partial or unspecified macronutrient distributions, whereas the proposed longevity diet framework explicitly defines macronutrient ranges. In addition, this framework provides detailed food group-specific intake recommendations adjusted to a 2,000 kcal/day reference, reflecting South Korean dietary patterns. Furthermore, while existing dietary models typically emphasize either food groups or nutrients, the proposed framework integrates both food-based and nutrient-based approaches. It also incorporates disease-specific nutritional considerations and emphasizes dietary quality by promoting whole grains, vegetables, legumes, and unsaturated fats, while limiting refined carbohydrates, added sugars, and saturated fats. Overall, the proposed longevity diet framework represents an integrated, population-specific dietary approach that combines the strengths of existing models while addressing their limitations.

Adaptation of the EAT-Lancet diet based on dietary reference intakes for South Koreans

The adaptation of the EAT-Lancet Healthy Diet to a 2,000 kcal/day reference for the longevity diet framework is presented in [Table 3](#). The original EAT-Lancet recommendations, based on a 2,400 kcal/day intake, were proportionally adjusted to reflect the average energy requirements of South Korean adults. For carbohydrate sources, whole grain intake was reduced to 33–62 g/meal, with refined grains excluded. Root and starchy vegetables were included as optional components, while higher intakes of vegetables (53–160 g/meal) and fruits (27–80 g/meal) were recommended, prioritizing fresh and diverse sources. For dairy products, moderate intake of up to 133 g/meal was suggested, with a preference for low-fat options. In the protein group, red and processed meat intake was minimized, whereas lean poultry, fish, legumes, and plant-based protein sources were emphasized. Overall, protein intake was structured to include both animal and plant sources to promote a balanced dietary pattern. Intake of nuts and seeds was maintained within a moderate range (0–20 g/meal) as a source of unsaturated fats. Unsaturated fats, such as olive oil and other plant-based oils, were recommended as the primary fat source, while saturated fat intake was limited to less than 7% of total energy. In addition, intake of sugar and sodium was controlled within defined limits consistent with chronic disease prevention guidelines. Overall, the adapted dietary model reflects both nutritional adequacy and cultural applicability while maintaining the core principles of the EAT-Lancet diet.

Nutritional recommendations for chronic disease prevention

The nutritional recommendations for chronic disease prevention based on the longevity diet framework are presented in [Table 4](#). These recommendations were structured across key health domains, including weight management, glycemic control, and cardiovascular health, to provide targeted guidance within a unified dietary framework. For energy management, an energy deficit of approximately 500 kcal/day was recommended for weight management, while energy adjustment was applied conditionally for glycemic control and cardiovascular health in the presence of excess body weight. For carbohydrate quality, whole grains were prioritized across all domains, with recommended intake ranges of 25–67 g/meal. Dietary fiber intake was emphasized, with targets of ≥ 25 g/day for weight management, 25–29 g/day for glycemic control, and ≥ 12 g/1,000 kcal for cardiovascular health. Additionally, fiber recommendations were differentiated by type, with insoluble fiber prioritized for weight management and soluble fiber emphasized for glycemic control. Refined carbohydrates and added sugars were restricted across all domains, with added sugar limited to < 5% of total energy for glycemic control and cardiovascular health. Protein intake was maintained at adequate levels across all domains, with a recommended range of 15%–35% of total energy for weight management and at least 0.8 g/kg body weight/day for cardiovascular health. A balanced 1:1 animal to plant protein ratio was consistently recommended. For fat quality, saturated fat intake was limited to < 7% of total energy, trans fat to < 1%, and dietary cholesterol to < 300 mg/day across all domains. Sodium intake was also controlled, with a general target of $\leq 2,300$ mg/day and a stricter range of $\leq 1,500$ –2,300 mg/day for cardiovascular health. Overall, these recommendations provide a comprehensive, condition-specific approach integrating macronutrient composition, dietary quality, and nutrient-specific targets to support chronic disease prevention and healthy aging.

Nutritional recommendations for functional longevity: cognitive, muscle, and skin health

The nutritional recommendations supporting the functional longevity diet framework are presented in [Table 5](#). These recommendations were structured across key functional domains, including cognitive function, muscle health, and skin health, to complement disease prevention with functional maintenance. For carbohydrate quality, whole grains were prioritized across all domains, with a recommended intake of ≥ 3 servings/day for cognitive function. Dietary fiber intake was emphasized, with targets of

Table 3. Adaptation of the EAT-Lancet healthy diet based on dietary reference intakes for the longevity diet framework

| Food group | EAT-Lancet healthy diet | | Longevity diet | |
|---|--------------------------------------|--|------------------------------------|-------------------------------------|
| | 2,400 kcal/day reference (g/day) | 2,000 kcal/day recommendation (g/meal) | Allowable range (g/meal) | Consideration |
| Carbohydrate source | | | | |
| Whole grains (rice, wheat, maize, and others) | 210 (20%–50% of daily energy intake) | 61.9 | 33–62 | Refined grains excluded |
| Root and starchy vegetables (potato and sweet potato) | 50 (0–100) | 27.0 | 0–27 | Optional |
| Vegetables (all types) | 300 (200–600) | 80.0 | 53–160 | Includes green and yellow varieties |
| Fruits (all types) | 200 (100–300) | 80.0 | 27–80 | Whole fresh fruit preferred |
| Dairy | | | | |
| Dairy (milk or equivalents) | 250 (0–500) | 100 | 0–133 | Low-fat products recommended |
| Protein sources | | | | |
| Beef, lamb, and pork | 15 (0–30) | 40.0 | Serving (animal)+1 serving (plant) | Minimize intake |
| Chicken and poultry | 30 (0–60) | 50.0 | | Lean cuts preferred |
| Eggs | 15 (0–25) | 50.0 | | Moderate intake |
| Fish | 30 (0–100) | 50.0 | | Rich in omega-3 fatty acids |
| Legumes | 75 (0–150) | - | | Primary plant protein source |
| Nuts and seeds | 50 (0–75) | 8.0 | 0–20 | Source of unsaturated fat |
| Fats, sugars, and salt | | | | |
| Unsaturated fats (olive oil, canola oil) | 40 (20–80) | - | 5–21 | Predominant fat source |
| Saturated fat | 5 (0–10) | <7% of total energy | - | Restricted, <7% of total energy |
| Sugar | 30 (0–30) | 10%–20% of total energy | - | 10%–20% of total energy intake |
| Sodium | <2 | ≤2 | - | - |

Table 4. Nutritional recommendations for chronic disease prevention based on the longevity diet framework

| Nutritional strategy | Weight management | | Glycemic control | | Cardiovascular health |
|-----------------------------------|------------------------------------|-------------------|-------------------|------------------|-----------------------|
| | Energy restriction | Energy management | Weight management | Glycemic control | |
| Energy management | | | | | |
| Energy restriction | -500 kcal/day | - | If overweight | - | If overweight |
| Carbohydrate quality | | | | | |
| Whole grains (priority) (g/meal) | 25–67 | ✓ | ✓ | ≥12 g/1,000 kcal | ✓ |
| Dietary fiber, total (g/day) | ≥25 | Insoluble | 25–29 | Soluble | - |
| Dietary fiber type (priority) | Restrict | Restrict | Restrict | Restrict | Restrict |
| Refined carbohydrates | Restrict | Restrict | <5% | <5% | <5% |
| Added sugar (% of total energy) | Restrict | Restrict | <5% | <5% | <5% |
| Protein intake | | | | | |
| Total protein | Adequate (15%–35% of total energy) | Adequate | 1:1 | 1:1 | ≥0.8 g/kg BW/day |
| Animal to plant protein ratio | 1:1 | 1:1 | 1:1 | 1:1 | 1:1 |
| Fat quality | | | | | |
| Saturated fat (% of total energy) | <7 | <7 | <7 | <7 | <7 |
| Trans fat (% of total energy) | <1 | <1 | <1 | <1 | <1 |
| Cholesterol (mg/day) | <300 | <300 | <300 | <300 | <300 |
| Sodium | | | | | |
| Sodium (mg/day) | ≤2,300 | ≤2,300 | ≤2,300 | ≤2,300 | ≤1,500–2,300 |

Values are based on a 2,000 kcal/day reference. Protein intake was structured using the food exchange system (one serving each from animal and plant sources per meal). BW, body weight; ✓, fully addressed or emphasized.

Table 5. Nutritional recommendations for functional domains based on the longevity diet framework

| Nutritional strategy | Cognitive function | Muscle health | Skin health |
|--|--------------------|---------------|----------------------|
| Carbohydrate quality | | | |
| Whole grains (priority) | ≥3 Servings/day | ✓ | ✓ |
| Dietary fiber, total (g/day) | ≥24 | Adequate | ≥25 |
| Refined carbohydrates | Restrict | Restrict | Restrict |
| Added sugar (% of total energy) | <5 | <5 | <5 |
| Protein intake | | | |
| Total protein (g/kg BW/day) | ≥0.8 | 1.0–1.2 | Balanced |
| Essential amino acids | - | ≥20 g/day | - |
| Leucine/BCAAs | - | ✓ | - |
| Animal to plant protein ratio | 1:1 | 1:1 | 1:1 |
| Fat quality | | | |
| Saturated fat (% of total energy) | <7% | Restrict | Restrict |
| Trans fat (% of total energy) | <1% | Restrict | Restrict |
| Cholesterol (mg/day) | <300 | - | - |
| Omega-3 fatty acids (EPA/DHA) | ✓ | ✓ | ✓ |
| Omega-6 fatty acids | - | - | Skin barrier support |
| Key micronutrients and functional foods | | | |
| Potassium-rich vegetables | - | - | - |
| Berries (antioxidants) | ≥2 Servings/wk | ✓ | ✓ |
| Vitamin C | - | - | ✓ |
| Vitamin E | - | - | ✓ |
| β-Carotene and polyphenols | - | - | ✓ |
| Selenium | - | - | ✓ |
| Magnesium | - | ✓ | - |
| Vitamin D | - | ✓ | - |
| Calcium (dairy) | - | ✓ | - |
| Sodium | | | |
| Sodium (mg/day) | ≤2,300 | ≤2,300 | ≤2,300 |

BW, body weight; BCAA, branched-chain amino acid; EPA, eicosapentaenoic acid; DHA, docosahexaenoic acid; ✓, recommended or specifically emphasized; -, no specific recommendation for this domain.

≥ 24 g/day for cognitive function and ≥ 25 g/day for skin health, while adequate intake was recommended for muscle health. Refined carbohydrates and added sugars were restricted across all domains, with added sugar limited to < 5% of total energy. Protein intake was tailored to functional needs. A minimum intake of ≥ 0.8 g/kg body weight/day was recommended for cognitive function, whereas 1.0–1.2 g/kg body weight/day was suggested for muscle health. Essential amino acids (≥ 20 g/day) and branched-chain amino acids (BCAAs), including leucine, were specifically emphasized for muscle health. Taken together, when protein requirements across functional domains are met through a combination of animal- and plant-based sources, the dietary pattern naturally converges toward an approximate 1:1 animal to plant protein ratio, supporting its use as a practical, evidence-based recommendation. Regarding fat quality, saturated and trans fats were restricted across all domains. Omega-3 fatty acids (eicosapentaenoic acid [EPA] and docosahexaenoic acid [DHA]) were empha-

sized for cognitive function and muscle health, whereas omega-6 fatty acids were considered important for maintaining skin barrier function. Key micronutrients and functional foods were also incorporated. Berry intake (≥ 2 servings/wk) was emphasized for cognitive function due to its antioxidant properties. For skin health, antioxidants such as vitamin C, vitamin E, β-carotene, polyphenols, and selenium were highlighted. For muscle health, magnesium, vitamin D, and calcium were emphasized to support muscle function and metabolism. Sodium intake was consistently limited to ≤ 2,300 mg/day across all domains. Overall, these recommendations provide a comprehensive nutritional approach to functional longevity by targeting nutrient intake and dietary quality, complementing disease prevention strategies.

DISCUSSION

This study systematically reviewed major dietary models, includ-

ing the Mediterranean, DASH, MIND, and EAT-*Lancet* diets, as well as clinical nutrition guidelines, to propose nutritional criteria and dietary composition principles for a longevity diet framework tailored to South Korean dietary patterns and physiological characteristics.

The Mediterranean and DASH diets are well-established, evidence-based models associated with reduced risks of major cardiovascular events and mortality [18]. The Mediterranean diet is characterized by a high intake of unsaturated fats, a predominantly plant-based dietary pattern, and moderate use of olive oil and has been consistently associated with reduced incidence of cardiovascular disease and all-cause mortality in prospective cohort studies [19,20]. The DASH diet emphasizes sodium restriction and increased intake of potassium-, calcium-, and magnesium-rich foods and has been shown to significantly reduce systolic blood pressure [21].

However, although both dietary models promote increased plant-based protein intake, they do not provide specific guidance on the balance between animal and plant protein sources. To address this limitation, the present study considered that when protein requirements are met through a combination of animal- and plant-based sources, dietary patterns tend to converge toward an approximate 1:1 animal to plant protein ratio. This balance reflects both the cardioprotective effects of plant proteins [22] and the importance of essential amino acids, particularly leucine, in supporting muscle protein synthesis and maintaining muscle function [23,24].

The MIND diet, developed from the Mediterranean and DASH diets, focuses on cognitive health and emphasizes the frequency of consumption of specific food groups, such as green leafy vegetables, berries, and nuts [25]. Higher adherence to the MIND diet has been associated with a lower incidence of Alzheimer disease and reduced cognitive decline [26]. However, it is primarily based on food frequency recommendations and lacks quantitative guidance on macronutrient composition and energy intake, limiting its applicability in practical meal planning. This poses challenges for translation into real-world dietary patterns, particularly in populations with mixed-dish eating habits, such as South Koreans [27]. To address this limitation, the present study complemented food frequency-based recommendations with quantitative macronutrient distribution and micronutrient targets, enabling a more precise and practically applicable dietary framework. The EAT-*Lancet* diet is a globally recognized model that integrates human health and environmental sustainability by providing quantitative intake ranges for food groups [7]. It has been widely refer-

enced in public health and environmental policy due to its emphasis on plant-based foods and reduced consumption of animal-source products. However, the EAT-*Lancet* diet is based on a 2,400 kcal reference intake and reflects Western dietary patterns, which differ substantially from traditional South Korean dietary habits and average energy intake levels [11]. According to the 2022 Korea National Health and Nutrition Examination Survey, the average daily energy intake of South Korean adults is approximately 2,000 kcal [28], consistent with the estimated average energy requirement in the 2025 Dietary Reference Intakes for Koreans. In addition, South Korean dietary patterns are characterized by high consumption of rice, vegetables, and fermented foods, reflecting a structure distinct from Western dietary models. In this context, the present study adapted the core principles of the EAT-*Lancet* diet—namely, plant-based emphasis, moderate restriction of animal-source foods, and limitation of ultra-processed foods—while recalibrating food group intake levels to a 2,000 kcal reference and incorporating key elements of the South Korean dietary pattern, including vegetables, seaweeds, fermented foods, and whole grains.

Older populations frequently experience multimorbidity, in which multiple chronic conditions coexist, making single-disease-focused dietary approaches insufficient [29]. Given this complexity, existing dietary models, which are often based on general dietary patterns or food group recommendations, may have limited capacity to address multiple health conditions simultaneously.

In contrast, the proposed longevity diet framework provides quantitative macronutrient distribution and food group intake recommendations, enabling integrated consideration of multiple health domains, including weight management, glycemic control, cardiovascular health, cognitive function, muscle maintenance, and skin health. This approach may serve as a practical dietary framework reflecting the multifaceted health needs of aging populations.

Limitations

This study has several limitations. First, the proposed nutritional criteria were developed using a literature-based approach and were not empirically validated in the South Korean population; therefore, their feasibility and effectiveness in real-world settings remain to be confirmed. Second, the study used a novel integrative approach synthesizing multiple dietary models originally developed for different populations and health outcomes. While intended to reflect a broad evidence base, this harmonization involves assumptions that require further validation. Third, al-

though presented as a longevity diet framework, the recommendations were primarily derived from evidence on chronic disease prevention and functional health rather than direct evidence on lifespan or mortality outcomes. Future studies, including expert validation and clinical trials, are needed.

Conclusion

This study proposed nutritional criteria for a longevity diet framework by integrating major dietary models, including the Mediterranean, DASH, MIND, and EAT-*Lancet* diets, while considering the dietary characteristics of the South Korean population. The proposed criteria encompass energy balance, macronutrient composition, food group intake, and protein quality and are structured to address multiple health domains, including weight management, glycemic control, cardiovascular health, cognitive function, muscle function, and skin health. By adapting existing dietary models to the South Korean dietary context, this study offers a more practical and culturally relevant approach to healthy aging. The integration of multiple health domains within a single dietary framework may help address the complex health challenges observed in aging populations. However, the proposed criteria have not yet been validated in real-world settings. Further studies, including clinical trials and population-based research, are needed to assess their long-term health effects and applicability.

ARTICLE INFORMATION

ORCID

Soyoung Jung: <https://orcid.org/0009-0002-2508-8814>

Hae Jin Kang: <https://orcid.org/0000-0002-0345-9365>

Mijoo Choi: <https://orcid.org/0000-0003-4527-2475>

Yoo Kyoung Park: <https://orcid.org/0000-0002-8536-0835>

Authors' contributions

Conceptualization: SJ, YKP. Data curation and analysis: SJ, MC. Investigation: SJ, HJK, MC. Methodology: HJK, MC. Project administration: YKP. Writing - original draft: SJ, HJK, MC. Writing - review and editing: all authors. All authors read and approved the final manuscript.

Conflicts of interest

None.

Funding

None.

Acknowledgments

The authors would like to thank Hy Co., Ltd for their support of this study.

Data availability

The datasets are not publicly available but are available from the corresponding author upon reasonable request.

REFERENCES

1. Yeung SS, Kwan M, Woo J. Healthy diet for healthy aging. *Nutrients* 2021;13:4310.
2. Beard JR, Officer AM, Cassels AK. The world report on ageing and health. *Gerontologist* 2016;56 Suppl 2:S163-6.
3. Randall E, Marshall JR, Graham S, Brasure J. Patterns in food use and their associations with nutrient intakes. *Am J Clin Nutr* 1990; 52:739-45.
4. Hu FB. Dietary pattern analysis: a new direction in nutritional epidemiology. *Curr Opin Lipidol* 2002;13:3-9.
5. Estruch R, Ros E, Salas-Salvado J, et al. Primary prevention of cardiovascular disease with a Mediterranean diet. *N Engl J Med* 2013; 368:1279-90.
6. Morris MC, Tangney CC, Wang Y, et al. MIND diet slows cognitive decline with aging. *Alzheimers Dement* 2015;11:1015-22.
7. Willett W, Rockstrom J, Loken B, et al. Food in the Anthropocene: the EAT-*Lancet* Commission on healthy diets from sustainable food systems. *Lancet* 2019;393:447-92.
8. Rockstrom J, Thilsted SH, Willett WC, et al. The EAT-*Lancet* Commission on healthy, sustainable, and just food systems. *Lancet* 2025;406:1625-700.
9. Choi SW. A journey to explore the health properties of traditional Korean diet: a commentary. *J Ethn Foods* 2023;10:9.
10. Tak E, Kim J, Lee H, Kang M. Secular trends in dietary patterns among Korean adults: using data from the 2007-2022 Korea National Health and Nutrition Examination Survey. *Nutr J* 2025;24:163.
11. Tessier AJ, Wang F, Korat AA, et al. Optimal dietary patterns for healthy aging. *Nat Med* 2025;31:1644-52.
12. Kim DH, Rockwood K. Frailty in older adults. *N Engl J Med* 2024; 391:538-48.
13. Clegg A, Young J, Iliffe S, Rikkert MO, Rockwood K. Frailty in elderly people. *Lancet* 2013;381:752-62.
14. Gross DC, Dahringer JC, Bramblett P, et al. The relationship between a Mediterranean diet and frailty in older adults: NHANES 2007-2017. *Nutrients* 2025;17:326.
15. Santilli V, Bernetti A, Mangone M, Paoloni M. Clinical definition of

- sarcopenia. *Clin Cases Miner Bone Metab* 2014;11:177-80.
16. Ng JY, Yan Ng XM, Wong QY, Chew FT. Dietary interventions in skin ageing: a systematic review and meta-analysis. *J Physiol Anthropol* 2025;44:26.
 17. Tranchida N, Molinari F, Franco GA, Cordaro M, Di Paola R. Potential role of dietary antioxidants during skin aging. *Food Sci Nutr* 2025;13:e70231.
 18. Sanches Machado d'Almeida K, Ronchi Spillere S, Zuchinali P, Correa Souza G. Mediterranean diet and other dietary patterns in primary prevention of heart failure and changes in cardiac function markers: a systematic review. *Nutrients* 2018;10:58.
 19. Estruch R, Ros E, Salas-Salvado J, et al. Primary prevention of cardiovascular disease with a Mediterranean diet supplemented with extra-virgin olive oil or nuts. *N Engl J Med* 2018;378:e34.
 20. Sofi F, Cesari F, Abbate R, Gensini GF, Casini A. Adherence to Mediterranean diet and health status: meta-analysis. *BMJ* 2008;337:a1344.
 21. Sacks FM, Svetkey LP, Vollmer WM, et al. Effects on blood pressure of reduced dietary sodium and the Dietary Approaches to Stop Hypertension (DASH) diet. *N Engl J Med* 2001;344:3-10.
 22. Naghshi S, Sadeghi O, Willett WC, Esmailzadeh A. Dietary intake of total, animal, and plant proteins and risk of all cause, cardiovascular, and cancer mortality: systematic review and dose-response meta-analysis of prospective cohort studies. *BMJ* 2020;370:m2412.
 23. Bauer J, Biolo G, Cederholm T, et al. Evidence-based recommendations for optimal dietary protein intake in older people: a position paper from the PROT-AGE Study Group. *J Am Med Dir Assoc* 2013;14:542-59.
 24. Moore DR, Churchward-Venne TA, Witard O, et al. Protein ingestion to stimulate myofibrillar protein synthesis requires greater relative protein intakes in healthy older versus younger men. *J Gerontol A Biol Sci Med Sci* 2015;70:57-62.
 25. Barnes LL, Dhana K, Liu X, et al. Trial of the MIND diet for prevention of cognitive decline in older persons. *N Engl J Med* 2023;389:602-11.
 26. Morris MC, Tangney CC, Wang Y, Sacks FM, Bennett DA, Aggarwal NT. MIND diet associated with reduced incidence of Alzheimer's disease. *Alzheimers Dement* 2015;11:1007-14.
 27. Timlin D, Giannantoni B, McCormack JM, et al. Comparison of barriers and facilitators of MIND diet uptake among adults from Northern Ireland and Italy. *BMC Public Health* 2021;21:265.
 28. Trends in the intake of energy, 2013-2022. *Public Health Weekly Rep* 2024;17:1700-1.
 29. Marengoni A, Angleman S, Melis R, et al. Aging with multimorbidity: a systematic review of the literature. *Ageing Res Rev* 2011;10:430-9.