International Journal of Social Sciences Perspectives
ISSN 2577-7750
Vol. 17, No. 1, pp. 20-29
2026
DOI: 10.33094/ijssp.v17i2.2468

Health promotion strategies for elderly service enterprises: A study on the promotion of healthy meals for senior citizens and perceived quality

Chiung- Hui Tseng[1]
Hsiao-Chi Ling[2*]

[1]*Department of Hotel, Restaurant and Culinary Management, Deh Yu College of Nursing and Health, Taiwan.*
[1]*Email: chtseng@ems.dyhu.edu.tw*
[2]*Department of Business and Entrepreneurship Management, Kainan University, Taiwan.*
[2]*Email: max.ling911@msa.hinet.net*

Keywords:
Healthy diet
Perceived quality
Senior citizens.

Received: *14 April 2026*
Revised: *9 June 2026*
Accepted: 17 June 2026
Published: 16 July 2026
(Corresponding Author)*

Abstract

This study aimed to develop and evaluate healthy boxed meals for older adults and to examine how perceived meal quality relates to satisfaction and consumption behavior. Hospitality-management students designed menus according to healthy-eating principles, calculated energy and macronutrient content, allocated portions from the six food groups, and converted trial menus into standardized recipes for 50 servings. After consuming the meals at the Shilin Senior Service Center of Evergreen University, participants completed a questionnaire assessing the importance and satisfaction of meal attributes and their consumption behavior. Of 50 questionnaires distributed, 45 were returned and 37 were valid, yielding an effective response rate of 82.2%. Satisfaction was high across all 14 meal-quality items, with mean scores above 4.3. The highest-rated attributes included dish attractiveness, ingredient freshness, low-oil, low-salt, low-fat, and high-fiber preparation, ingredient variety, hygiene, portion appropriateness, and side dishes. Significant group differences were limited to satisfaction with nutritional balance and portion size according to self-rated nutrition knowledge. Perceived importance, satisfaction, and consumption behavior were positively correlated, with satisfaction showing the strongest association with consumption behavior. After the meal, 91.9% of participants reported feeling healthier, and all indicated willingness to repurchase. These findings suggest that senior-oriented healthy meals should combine nutritional balance with freshness, palatability, visual appeal, hygiene, and appropriate portions. Food-service providers and community senior centers can use these attributes to improve perceived quality, encourage repeat purchasing, and support healthier eating among older consumers.

Funding: This study received no specific financial support.
Institutional Review Board Statement: The study was approved by the Institutional Review Committee of Deh Yu College of Nursing and Health, Taiwan (December 15, 2025). Informed verbal consent was obtained from all participants and all data were anonymized to protect participants' confidentiality.
Transparency: The authors declare that the manuscript is honest, truthful and transparent, that no important aspects of the study have been omitted and that all deviations from the planned study have been made clear. This study followed all rules of writing ethics.
Competing Interests: The authors declare that they have no competing interests.
Authors' Contributions: Both authors contributed equally to the conception and design of the study. Both authors have read and agreed to the published version of the manuscript.

1. Introduction

1.1. Research Background

In the twenty-first century, Taiwan has experienced rapid social development, economic growth, improvements in education, and significant advances in medical technology. These changes have extended average life expectancy and gradually transformed Taiwan's population structure. According to the National Development Council, Taiwan officially became an aging society in 1993. With declining birth rates and longer life expectancy, Taiwan is moving toward an aged and super-aged society. Population aging is no longer only a family care issue; it has become an important concern for public health, social welfare, and industrial development.

The World Health Organization (2015) stated that healthy aging does not simply mean living longer, but rather refers to the process of developing and maintaining the functional ability that enables well-being in

older age. In other words, maintaining health among older adults is closely related not only to medical care, but also to daily diet, nutritional intake, lifestyle, and social support. Therefore, helping older adults maintain health and reduce disease risks through appropriate dietary design has become an important research topic in an aging society.

According to data from the Department of Health, Executive Yuan, many of the ten leading causes of death in Taiwan are related to chronic diseases, and these diseases have shown a trend toward younger ages. This indicates that dietary patterns among the population may involve nutritional imbalance, excessive fat intake, high salt intake, and insufficient dietary fiber. Sharkey, Kovács, and Hsu (2023) pointed out that aging is often accompanied by physiological changes such as decreased appetite, changes in taste and smell, and difficulties in chewing or swallowing. These factors may affect nutritional intake and further increase the risk of chronic disease, disability, and reduced quality of life.

In recent years, the proportion of people eating out has continued to increase. However, meals provided in the eating-out environment are usually designed according to general consumer preferences, convenience, and cost, and may not necessarily meet the nutritional needs of middle-aged and older adults. Deierlein, Morland, Scanlin, Wong, and Spark (2014) indicated that the dietary quality of older adults is affected by health status, socioeconomic conditions, living environment, and dietary behaviors. Therefore, meal design for older adults should not only focus on calorie supply, but should also consider nutritional balance, food texture, taste acceptance, and dining convenience.

In addition, as health awareness among senior consumers continues to rise, government agencies have actively promoted a culture of healthy eating. Medical institutions have also emphasized the importance of low-oil, low-salt, and high-fiber diets, while community activities have gradually included healthy meal courses. Shams-White et al. (2023) noted that dietary quality can be assessed through factors such as vegetables, fruits, whole grains, protein, sodium, and saturated fat. This suggests that healthy meal design should consider both nutrient composition and overall dietary patterns. Therefore, healthy meals for older adults are not only a nutritional issue, but also involve food-service design, consumer acceptance, and the feasibility of community promotion.

In the field of food-service and consumer research, Martilla and James (1977) proposed Importance–Performance Analysis, suggesting that researchers can identify priority areas for improvement by comparing consumers' perceived importance of service attributes with their satisfaction or performance evaluations. This method is suitable for research on healthy meals for older adults. By understanding older adults' evaluations of nutrition, taste, appearance, portion size, price, ease of chewing, and overall satisfaction, researchers can provide useful references for future meal design and service improvement.

Therefore, in response to the growing dietary consumption market created by an aging society, this study develops healthy meal menus that meet the needs of older adults. Based on the healthy-meal principles promoted by the Taipei City Government Department of Health, and with the professional guidance of licensed nutritionists and hospitality management teachers, this study designs meals that consider calories, protein, fat, carbohydrates, and food-group portions. The research team also considers ingredients, shapes, seasoning, cooking methods, color, texture, temperature, viscosity, flavor, and plating. Through repeated discussion, trial production, and cooperation with chefs, small-batch recipes are developed into standardized recipes suitable for large-scale preparation and community promotion. After the meals are provided, surveys are conducted to analyze older adults' perceived importance and satisfaction regarding healthy meals, providing references for the future development of senior food-service industries.

1.2. Research Purposes

The main purpose of this study is to respond to Taiwan's aging society and the trend toward healthy eating by developing healthy meals that meet the nutritional needs and consumption preferences of older adults. This study also aims to examine older adults' perceived importance and satisfaction regarding different attributes of healthy meals. The specific purposes are as follows:

1. To explore the dietary needs of older adults and the development trends of the senior food-service market in an aging society.
2. To design healthy meal menus that meet the nutritional needs of older adults based on healthy-meal principles, and to calculate the calories, protein, fat, carbohydrates, and food-group portions of each meal.
3. To develop small-batch trial meals into standardized recipes suitable for large-scale preparation and community promotion through professional cooperation among nutritionists, hospitality management teachers, and chefs.
4. To understand older adults' perceived importance of healthy meal attributes, including nutrition, taste, appearance, texture, portion size, price, convenience, and overall acceptance.
5. To analyze older adults' satisfaction after consuming the healthy meals and compare the differences between perceived importance and satisfaction.
6. To provide suggestions for the design of healthy meals and improvement of food-service quality for older adults, serving as a reference for the senior food-service industry and community health

promotion programs.

1.3. Research Questions

Based on the research background and purposes above, this study seeks to answer the following questions.

1. What are the main dietary needs of older adults regarding healthy meals?
2. Can healthy meals designed according to healthy-meal principles meet older adults' needs in terms of nutritional balance, taste, texture, and dining convenience?
3. How important do older adults consider various healthy meal attributes, such as calorie control, low oil, low salt, high fiber, ingredient selection, cooking methods, color, plating, texture, temperature, portion size, and price?
4. What is the level of older adults' satisfaction with each healthy meal attribute after consuming the meals?
5. Are there differences between older adults' perceived importance and satisfaction regarding healthy meal attributes?
6. Which healthy meal attributes are considered important by older adults but receive relatively low satisfaction ratings, and should therefore be prioritized for future improvement?
7. Are the standardized healthy meal menus developed in this study feasible for large-scale preparation, community meal supply, and promotion in the senior food-service market?

2. Literature Review

2.1. Healthy Aging and the Importance of Healthy Diets for Senior Citizens

Population aging has become an important social issue in Taiwan. With the increase in life expectancy and the decline in birth rates, senior citizens' health, quality of life, and dietary care have received increasing attention. The World Health Organization (2015) pointed out that healthy aging does not simply mean extending life expectancy, but refers to maintaining the functional ability that enables well-being in older age. Therefore, diet is not only a matter of daily consumption, but also an important factor affecting senior citizens' physical function, disease prevention, and quality of life.

For senior citizens, healthy eating is closely related to the prevention and control of chronic diseases. Many chronic diseases, such as cardiovascular disease, hypertension, diabetes, obesity, and certain cancers, are associated with long-term dietary habits. Y.-H. Huang (2005) found that cardiovascular disease and endocrine-metabolic diseases were common among middle-aged and older chronic-disease patients. Many patients understood the dietary adjustments required by their illnesses, but their willingness to purchase health-conditioning meals was affected by eating habits, trust in product effectiveness, and concerns about hygiene and safety. This indicates that healthy meals for senior citizens must not only meet nutritional requirements, but also gain consumers' trust.

In addition, older adults may experience changes in chewing ability, swallowing function, appetite, taste, and digestion. Therefore, meal design for senior citizens should consider texture, flavor, portion size, and nutrient density. Healthy meals should emphasize low oil, low salt, low fat, high fiber, sufficient protein, adequate calcium, vitamin D, vitamin B12, zinc, and proper fluid intake. These principles help maintain muscle mass, bone health, immune function, and digestive health among older adults.

2.2. Development of Healthy Eating Behavior and Nutrition Knowledge

In recent years, studies related to healthy eating behavior and nutrition knowledge have gradually increased in Taiwan. Peng (2005) examined the effect of environmental nutrition intervention on students' cognition of healthy meals and nutrition knowledge at National Chengchi University. The results showed that after the introduction of healthy meals through campus food-service providers, students' nutrition-knowledge scores increased significantly. The proportion of students who did not understand healthy meals decreased, and students who had purchased healthy boxed meals considered their advantages to include being less oily, having clear calorie information, and having a lighter taste.

This finding suggests that nutrition education and environmental intervention can effectively improve consumers' understanding of healthy meals. In other words, if healthy meals are provided in daily food-service environments and accompanied by clear nutrition information, consumers may become more aware of healthy dietary choices. For senior citizens, who may have stronger health concerns, nutrition education may further enhance their willingness to choose healthy meals.

Lai (2005) studied factors influencing healthy eating behavior among university students and found that respondents had excessive intake of calories, protein, and fat, but insufficient intake of carbohydrates and dietary fiber. The study suggested that the government should promote healthy-meal concepts in affordable restaurants, adjust meal structures by increasing dietary fiber and carbohydrates, and reduce excessive protein and fat. Lai also emphasized that healthy meals should be made more delicious through the cooperation of restaurant chefs. This view is important for senior healthy-meal design, because senior citizens may value both health benefits and palatability.

2.3. Healthy Meals, Consumer Perceived Quality, and Satisfaction

Healthy meals must meet both objective nutritional standards and consumers' subjective expectations. Chen (2005) studied consumers' and food-service providers' perceived quality of healthy diets in Taipei healthy-diet restaurants guided by public-health authorities. The results showed significant differences between consumers and providers in perceived quality. Food-service providers rated the quality of healthy meals higher than consumers in terms of portion size, taste, ingredient freshness, low oil, low salt, low sugar, high fiber, variety, plating attractiveness, nutritional balance, reasonable price, good service, and health benefits.

This indicates that food-service providers and consumers may have different understandings of what constitutes a "good" healthy meal. Providers may focus more on nutrition standards and service design, while consumers may evaluate healthy meals based on taste, price, appearance, satiety, convenience, and trust. Therefore, when designing healthy meals for senior citizens, food-service organizations should not only follow nutrition guidelines, but also collect consumer feedback to understand seniors' real needs and satisfaction.

Martilla and James (1977) proposed Importance–Performance Analysis, arguing that consumer evaluations can be understood by comparing the importance of attributes with their actual performance or satisfaction. This method is suitable for healthy-meal studies because it can identify which attributes are important to senior citizens but have relatively low satisfaction. For example, if seniors consider freshness, hygiene, and taste very important, but satisfaction scores are low, these items should become priorities for improvement.

2.4. Meal Supply Systems and Policy Needs in Elder-Care Institutions

Healthy meals for senior citizens are also closely related to institutional meal-supply systems and public policy. H.-Y. Huang (2006) investigated meal-supply systems and policy needs in elder-care institutions. The study found that nearly 90% of institutions prepared meals themselves. However, 36.7% of these institutions would consider outsourcing meal preparation if costs could be reduced or if providers could prepare meals with textures suitable for older adults. The main reasons for considering outsourcing included increasing dish variety and reducing the time required for menu planning.

H.-Y. Huang (2006) also pointed out that policy needs included the development of meal distribution and supply-service systems, nutrition education, government subsidies, infrastructure support, formulation or revision of regulations, and relaxation of dietary restrictions for seniors. These findings show that senior meal services require the cooperation of government agencies, institutions, nutrition professionals, and food-service providers. Healthy meals for senior citizens should not be treated only as commercial products, but also as part of social care and health-promotion policy.

From this perspective, the promotion of healthy boxed meals in senior service centers has practical value. It can provide convenient and nutritionally balanced meal options, reduce the burden of meal preparation for older adults or care institutions, and support community-based health promotion.

2.5. Consumer Demand and Market Potential for Healthy Meals

As consumers' health awareness and living standards rise, people have become more concerned about the relationship between food, health, and disease prevention. Li (2002) pointed out that when consumers consider healthy meals, they emphasize nutritional balance and reliable or certified food sources. However, barriers include high prices and difficulty in finding healthy meals. Consumers also expect healthy-theme restaurants and express demand for delicious and refined healthy diets.

Li's findings indicate that healthy meals have market potential, but successful promotion depends on clear product positioning and target-market definition. For senior citizens, healthy meals should be designed according to their physiological needs, taste preferences, purchasing ability, and consumption habits. If healthy meals are too expensive, inconvenient to purchase, or perceived as bland and unattractive, seniors may be less willing to buy them even if they recognize their health benefits.

Therefore, food-service organizations should understand senior consumers' nutrition attitudes, health needs, and purchase motivations. They should also avoid making healthy meals appear overly medicalized or restrictive. Instead, healthy meals should be presented as delicious, safe, convenient, and beneficial to daily wellness.

2.6. Principles for Designing Healthy Meals

According to the healthy-meal principles prescribed by the Municipal Health Bureau, each set meal should control calories within an appropriate range, generally between 600 and 900 kcal per person. The caloric proportions of the three major nutrients should follow the recommendations of the Department of Health, Executive Yuan: fat should account for 20–30%, protein for 12–20%, and carbohydrates for 50–60%. Ingredients should mainly consist of natural foods, and excessive use of food additives and processed foods should be avoided.

In addition, healthy meals should provide varied side dishes, use seasonings appropriately, and apply fats and oils in accordance with balanced nutrition. Meals should also consider taste, appearance, portion size,

satiety, and hygiene. Food-service operations should comply with Good Hygienic Practices for Foods. These principles show that healthy meals are not simply low-calorie meals; they must achieve a balance among nutrition, flavor, safety, and consumer acceptance.

For senior citizens, meal design requires further adjustment. Portion sizes may be reduced by 15–25%, especially for staple foods and main dishes, while nutrient density should be maintained. Complex carbohydrates and high-fiber foods, such as fruits, vegetables, whole grains, and legumes, should be emphasized. However, because some older adults may have chewing difficulties, softer whole grains, cooked vegetables, and soft high-fiber fruits are more suitable.

2.7. Nutritional Design Guidelines for Senior Citizens

Protein intake is important for senior citizens because it helps maintain muscle mass and physical function. However, protein should be adequate rather than excessive, and should come from varied animal and plant sources. Fish, shellfish, soy products, eggs, lean meat, and legumes may be appropriate choices. Fat should also be used properly. Since many older adults may prefer lighter meals, dishes prepared with fish, vegetables, and lower-fat cooking methods are suitable for senior meal design.

Dairy products are important sources of calcium, vitamin D, protein, potassium, vitamin B12, and vitamin B2. Low-fat milk, yogurt, or low-fat dairy-based dressings may be incorporated into senior meals. In addition, vitamin B12, vitamin D, calcium, and zinc are nutrients that older adults may consume inadequately, so these nutrients should be considered when planning menus.

Salt use should be carefully controlled because many older adults have hypertension or follow low-salt diets. High-salt sauces and seasonings should be avoided. However, reducing salt does not mean sacrificing flavor. Spices, herbs, natural seasonings, and appropriate cooking methods can be used to enhance aroma and taste. Senior citizens, like other consumers, value delicious food; therefore, healthy meals should be both nutritious and enjoyable.

Fluid intake is another important issue for older adults. Because sensitivity to thirst may decline with age, older adults may not drink enough water. Therefore, meals may include soup, milk, tea, juice, or other suitable beverages to increase fluid intake. For seniors with chewing or swallowing problems, soft diets, finely cut vegetables, soft fruits, tofu pudding, pudding, or soft jelly may be used to increase meal variety while maintaining safety and nutritional balance.

3. Research Methods

3.1. Research Objectives

This study focuses on the design, preparation, and perceived quality of healthy meals for senior citizens. The research objectives are as follows:

1. To develop the twelve designed healthy-meal set recipes for senior citizens into standardized recipes suitable for large-scale preparation, community promotion, and meal supply.
2. To explore differences in perceived quality of healthy meals among senior citizens with different personal background characteristics. The study examines whether variables such as gender, marital status, age, religion, education level, occupation, self-rated health status, and disposable income influence seniors' perceived importance and satisfaction regarding healthy meals.
3. To provide practical demonstration outcomes as references for food-service operators in promoting healthy diets and developing healthy meal products for senior citizens.

3.2. Research Subjects

The research subjects were senior citizens enrolled in Evergreen University in the Shilin area of Taipei. The planned meal supply was mainly approximately 100 servings each time. Through this meal service, the study aimed to evaluate seniors' acceptance, satisfaction, and perceived quality of healthy meals.

3.3. Research Methods

This study adopted literature review, experimental method, questionnaire survey, and statistical analysis. The methods are described as follows:

(1) Literature Review

This study collected and organized domestic and international theses, books, journals, magazines, websites, and electronic database materials related to healthy eating for senior citizens, healthy-meal design, perceived meal quality, and consumer satisfaction. These materials served as the theoretical foundation and research basis of the study. In addition, relevant researchers and experts in Taiwan and abroad were consulted through email or interviews to obtain more complete research information and practical suggestions.

(2) Experimental Method

Based on the twelve designed healthy-meal set recipes for senior citizens, the study conducted repeated discussions, testing, and revisions with chefs. During the process, the study considered senior consumers' dietary preferences, taste acceptance, meal appearance, production cost, and potential sales volume. The small-

scale recipes were then gradually developed into standardized recipes suitable for large-scale preparation, community promotion, and meal supply.

(3) Questionnaire Survey

After the meal, the senior participants completed a questionnaire. The questionnaire served as the research instrument for collecting primary data. Its content mainly included participants' personal background information, as well as their perceived importance and satisfaction regarding the quality of healthy meals.

3.4. Data Analysis

After the questionnaires were collected, the data were analyzed statistically. The analysis methods were as follows:

(1) Descriptive Statistics

Descriptive statistics were used to describe the participants' basic personal attributes and the distribution of their needs and expectations regarding the perceived quality of healthy diets.

(2) Independent-Samples t Test

Independent-samples t tests were used to examine whether senior citizens of different genders and different self-rated health statuses differed significantly in their perceived quality of healthy meals.

(3) One-Way Analysis of Variance

One-way ANOVA was used to examine whether senior citizens with different personal background characteristics differed significantly in their perceived quality of healthy meals.

(4) Scheffe Post Hoc Test

When the results of one-way ANOVA showed significant differences, the Scheffe post hoc test was used for pairwise comparisons among groups. The significance level was set at $p < 0.05$.

(5) Pearson Correlation Analysis

Pearson correlation analysis was used to examine the relationship between seniors' perceived importance and satisfaction regarding healthy meals.

3.5. Research Procedure

The research procedure was as follows:

1. Observe current conditions related to healthy eating among senior citizens and identify research problems.
2. Search for relevant data and conduct a literature review.
3. Establish the research motivation and research objectives.
4. Define the research scope and research methods.
5. Design the research framework and hypotheses.
6. Design and pretest the questionnaire.
7. Conduct the formal questionnaire survey and collect data.
8. Analyze the data and develop conclusions and recommendations.

4. Research Results

4.1. Questionnaire Recovery and Procedure

This questionnaire survey used Evergreen University at the Shilin Senior Service Center as its research subject. Students in the Department of Hospitality Management designed healthy meal menus according to healthy eating principles by calculating calories, protein, fat, and carbohydrate contents and planning appropriate portions from the six food groups.

Considering that the meals had to match senior citizens' preferences and account for taste, presentation, cost, and sales volume, ingredients or cooking methods were adjusted and developed into standardized recipes for 50 servings. Fifty boxed meals were produced and supplied at the senior service center. Fifty questionnaires were distributed with the meals, 45 were returned, and 37 were valid, for an effective response rate of 82.2%.

4.2. Analysis of Senior Citizens' Background Variables

Among the returned valid samples, females accounted for 81.1% and males for 18.9%. Respondents aged 51-60 represented the largest group. Most respondents were married; the largest education group was senior high school. Most perceived their body shape as just right, followed by slightly overweight. The largest occupational group was military, civil-service, and teaching personnel. Most respondents had average monthly personal income of NT$15,001-30,000. In terms of interest in nutrition knowledge, 89.2% reported being interested, and 43.2% rated their own nutrition knowledge as good.

Table 1. Analysis of personal background variables.

Variable	Category	Frequency	Percentage
Gender	Male	7	18.9
	Female	30	81.1
Age	41-50	5	13.9
	51-60	18	50.0
	65 and above	13	36.1
Marital status	Unmarried	3	35.1
	Married	34	64.9
Education	Junior high school or below	2	5.4
	Senior high school	27	73.0
	University/college	8	21.6
Self-perceived body shape	Slightly thin	3	8.1
	Just right	19	51.4
	Slightly overweight	9	24.3
	Overweight	6	16.2
	Very good	4	10.8
	Good	19	51.4
	Average	14	37.8
Occupation	Military/civil service/education	12	32.4
	Business	10	27.1
	Service industry	8	21.6
	Freelance	2	5.4
	Homemaker	3	8.1
	Other	2	5.4
	NT$15,000 or below	11	29.7
Average monthly income	NT$15,001-30,000	18	48.7
	NT$30,001-40,000	3	8.1
	NT$40,001-50,000	3	8.1
	NT$50,001 or above	2	5.4
Self-rated nutrition knowledge	Not interested	3	8.1
	No opinion	1	2.7
	Interested	33	89.2
	Poor	3	8.1
	Average	18	48.6
	Good	16	43.2

4.3. Satisfaction with Each Perceived-Quality Item of Healthy Diets

Across the six dimensions and 14 items of healthy diets, all satisfaction means were above 4.3, indicating a high level of satisfaction. The highest mean was for attractiveness of dishes (4.732). Freshness of ingredients; low-oil, low-salt, low-fat, and high-fiber preparation; variation in ingredients; cleanliness and hygiene; appropriateness of overall portion; and side dishes all had mean satisfaction scores above 4.5. The lowest score was for price reasonableness (4.322), possibly because the promotional price of NT$90 allowed consumers to enjoy a refined set meal and created a sense of value for money.

Table 2. Senior citizens' satisfaction with perceived quality of healthy diets.

Item	N	Mean	Std. Dev.	Cronbach's alpha
Attractiveness of dishes	37	4.732	0.465	0.894
Variety of dishes	37	4.483	0.865	0.879
Low-oil, low-salt, low-fat, high-fiber preparation	37	4.572	0.624	0.878
Nutritional balance	37	4.389	0.96	0.895
Health-maintenance function	37	4.34	0.913	0.891
Variation in ingredients	37	4.554	0.682	0.886
Taste of dishes	37	4.493	0.787	0.892
Texture of dishes	37	4.447	0.74	0.876
Overall appearance of dishes	37	4.482	0.81	0.88
Freshness of ingredients	37	4.654	0.664	0.891
Cleanliness and hygiene	37	4.561	0.756	0.894
Appropriateness of overall portion	37	4.571	0.787	0.879
Side dishes	37	4.536	0.642	0.878
Reasonable price	37	4.322	0.955	0.892

4.4. Importance of Perceived-Quality Dimensions of Healthy Diets

The six dimensions of importance regarding healthy diets had an overall mean score of 4.488. A likely reason is that nutrition information is widely available and knowledge of health maintenance has increased, thereby raising the overall importance attached to healthy diets.

Table 3. Overall mean scores for importance of perceived-quality dimensions.

Dimension	N	Mean	Std. Dev.	Cronbach's alpha
Dish variation	37	4.315	0.439	0.813
Nutritional balance	37	4.337	0.533	0.792
Cooking techniques	37	4.067	0.79	0.839
Hygiene and safety	37	4.47	0.359	0.891
Portion size	37	4.134	0.75	0.843
Added value	37	4.191	0.503	0.798

4.5. Correlation Analysis of Importance, Satisfaction, and Consumption Behavior

Importance, satisfaction, and consumption behavior regarding healthy diets were positively correlated. The correlation between importance and satisfaction was 0.268 (p=0.000), the correlation between importance and consumption behavior was 0.147 (p=0.032), and the correlation between satisfaction and consumption behavior was 0.392 (p=0.000). Satisfaction with healthy diets had the strongest relationship with consumption behavior. Although the relationship between importance and consumption behavior was the weakest, all pairwise relationships were significant. Therefore, promotion of healthy diets should improve perceived quality so as to increase positive consumption behavior among senior citizens.

Table 4. Correlations among attitudes, satisfaction, and behavior toward healthy diets (Pearson's r).

Variable	Importance	Satisfaction	Consumption behavior
Importance	1.000	0.268**	0.147*
Satisfaction	0.268**	1.000	0.392**
Consumption behavior	0.147*	0.392**	1.000

Note: *p<0.05; **p<0.01.

4.6. Healthy-Diet Consumption Behavior among Senior Citizens

(1) Feelings after consuming healthy diets

After consuming the healthy meals, the highest proportion of respondents, 91.9%, reported feeling healthier. This was followed by 81.1% who felt that the meal provider had sufficient professional knowledge and could be trusted, and 75.7% who felt that the meal matched their own tastes. These findings indicate that seniors gave positive behavioral affirmation to the promotional activity.

Table 5. Feelings after consuming healthy diets.

Feeling	Percentage
Novelty	40.5
Felt healthier	91.9
Felt that the provider had sufficient professional knowledge and could be trusted	81.1
Felt more hygienic	62.2
Felt that it matched my own taste	75.7
No special feeling	5.4
Felt it was not tasty	2.7

(2) Important items in healthy-diet consumption

When asked about important items in healthy-diet consumption, respondents placed the greatest emphasis on high ingredient freshness (97.3%), followed by deliciousness (86.5%), hygiene and safety (83.8%), and product quality (81.1%). Seniors believed that healthy diets would be more attractive if they were delicious, hygienic, safe, and of good quality. Variety of choice and menu variation were also important. Requirements for utensil quality, added snacks, and service quality were relatively lower. Healthy-diet providers should therefore consider nutritional balance while also emphasizing ingredient diversity and freshness control and management.

Table 6. Important items in healthy-diet consumption among senior citizens.

Item	Percentage
Added snacks	51.4
Deliciousness	86.5
Service quality	40.5
Product quality	81.1
Hygiene and safety	83.8
Utensil quality	48.6
Menu variation	62.2
Diverse choices	70.3
High ingredient freshness	97.3

(3) Willingness to repurchase healthy diets

All respondents expressed willingness to purchase healthy diets again, demonstrating that this promotion of healthy boxed meals for senior citizens was affirmed by the majority and provided strong confidence for future promotion.

Table 7. Willingness to repurchase healthy diets.

Response	Sample size	Percentage
Total	37	100.0
Yes	37	100.0
No	0	0.0

5. Conclusions and Recommendations

5.1. Recommendations for Government Health Authorities

In the future, government health authorities should regard the guidance and assistance of restaurant operators in preparing healthy meals as a long-term priority. Authorities should encourage operators to adjust food formulas and cooking methods in accordance with healthy-diet principles, nutritional labeling requirements, and the overall concepts of food-service hygiene and safety. Once restaurant operators have fully understood and implemented these concepts, they will be able to successfully and sustainably provide diverse healthy meals for senior consumers, gain their trust, and make healthy diets a preferred choice at mealtimes.

5.2. Recommendations for Healthy Food-Service Organizations

(1) Healthy diets require both nutritional balance and creativity

If healthy food-service organizations can develop healthy meals with distinctive characteristics, they will be able to differentiate their products in the market and avoid price-based competition with other operators. To attract new consumer groups, such as senior citizens, operators should consider adding to or adjusting their business models, for example by establishing affordable yet refined healthy-theme restaurants. Creativity and nutrition can serve as strong selling points, increasing product appeal while meeting senior consumers' expectations for high added value.

(2) Sources of food-service ingredients must earn consumer trust

The results of this study show that senior consumers place great importance on ingredient freshness, hygiene and safety, and product quality. Consumers are willing to purchase healthy meals because they believe they are not only buying nutritional balance, but also hygiene, safety, freshness control, and quality management. Therefore, ingredient sources must be reliable and able to earn consumer trust.

(3) Healthy diets must also emphasize taste and appearance

Although some consumers may currently accept meals with less appealing flavors as long as they are labeled as healthy, healthy diets must be treated like ordinary food-service products if they are to become competitive in the market. Food-service operators should use a variety of fresh ingredients and natural seasonings to enhance flavor. They should also incorporate creativity into product development in order to provide healthy meals that are nutritious, delicious, and visually appealing.

(4) The healthy food-service industry should actively develop the senior market

This study provides supportive evidence of health-oriented behavior among senior consumers. Food-service organizations that wish to meet the nutritional and health-related expectations of senior citizens should strengthen their commitment to developing comprehensive nutrition-program strategies. By doing so, they can expand the senior healthy-food-service market while helping to implement national nutrition policies aimed at improving public health.

References

Chen, C.-L. (2005). *Consumers' and food-service providers' perceived quality of healthy diets: A case study of healthy-diet restaurants in Taipei*. Master's Thesis, Fu Jen Catholic University.

Deierlein, A. L., Morland, K. B., Scanlin, K., Wong, S., & Spark, A. (2014). Diet quality of urban older adults age 60 to 99 years: The cardiovascular health of seniors and built environment study. *Journal of the Academy of Nutrition and Dietetics, 114*(2), 279-287.

Huang, H.-Y. (2006). *Meal-supply systems and policy needs in elder-care institutions: Exploring new development opportunities for the food industry*. Master's Thesis, Tunghai University.

Huang, Y.-H. (2005). *Demand for health-conditioning meals among middle-aged and older chronic-disease patients: A case study of Jen-Ai Hospital in Dali City, Taichung County*. Master's Thesis, Tunghai University.

Lai, T.-C. (2005). *Factors influencing healthy eating behavior among university students*. Master's Thesis, National Taiwan Normal University.

Li, T.-Y. (2002). *A study of organic food-service consumers' consumption behavior and expectations*. Master's Thesis, Shih Hsin University.

Martilla, J. A., & James, J. C. (1977). Importance-performance analysis. *Journal of Marketing, 41*(1), 77-79. https://doi.org/10.1177/002224297704100112

Peng, S.-Y. (2005). *The effects of healthy-meal intervention on university students' nutrition cognition*. Master's Thesis, Taipei Medical University.

Shams-White, M. M., Pannucci, T. E., Lerman, J. L., Herrick, K. A., Zimmer, M., Mathieu, K. M., . . . Reedy, J. (2023). Healthy eating index-2020: Review and update process to reflect the dietary guidelines for Americans, 2020-2025. *Journal of the Academy of Nutrition and Dietetics, 123*(9), 1280-1288.

Sharkey, A., Kovács, B., & Hsu, G. (2023). Expert critics, rankings, and review aggregators: The changing nature of intermediation and the rise of markets with multiple intermediaries. *Academy of Management Annals, 17*(1), 1-36.

World Health Organization. (2015). *Healthy diet*. Geneva, Switzerland: World Health Organization.