

Special Report



Korean Food Exchange Lists for Diabetes Meal Planning: Revised 2023

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ABSTRACT

A food exchange list is a tool developed to help diabetic patients control their energy intake and plan balanced meals. Korean food exchange lists were first developed in 1988, revised in 1995, and updated again in 2010. With rapidly changing dietary habits and increasing demand for diverse food cultures, the Korean Diabetes Association in cooperation with 4 related organizations established a Task Force Team (TFT) to revise food exchange lists in March 2022. Starting with a workshop, TFT held 11 official revision meetings, culminating in a public hearing in May 2023. The final revised version of Korean food exchange lists was published in December 2023. Key outcomes of the revision are summarized as follows: 1. Based on the National Standard Food Composition Table 10.0 database, the existing classification system and nutrient standards for each food group remain unchanged this time. 2. Based on a survey conducted among diabetes educators, the number of items on the food exchange lists has increased from 339 in 2010 to 435 this time. 3. Considering patients' usual eating habits, meal planning examples were developed distributing food group exchange units by energy level based on 3 types of proportions of carbohydrate energy (40%–45%, 50%–55%, 60%–65%). 4. Due to limitations in real-time updates for rapidly changing information, detailed guidance on how to access and interpret the data is provided. These revisions will help people with diabetes manage their blood sugar levels and facilitate the implementation of healthy meal planning in various other conditions, including obesity.

Keywords: Diet, diabetic; Korea; Food; Nutrition therapy; Meals

INTRODUCTION

Food exchange lists are useful tools for conducting nutrition education and meal planning and promoting healthy eating patterns. They are also widely used in dietary therapy for various conditions such as diabetes and obesity. The Korean food exchange lists were first developed

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Conflict of Interest

The authors declare that they have no competing interests.

Author Contributions

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in 1988 by the Korean Diabetes Association (KDA), the Korean Dietetic Association, and the Korean Nutrition Society to suit the Korean context. They were revised in 1995 for the second edition and then in 2010 for the third edition, reaching their current form [1-4]. Over the past decade, eating habits have changed rapidly. There is a growing demand for diverse food culture that reflects individual preferences. Additionally, the importance of individualized, customized nutritional treatment and management has been increasingly emphasized. As the need to revise food exchange lists to reflect diverse types of food and eating patterns in daily life emerged, the Food and Nutrition Committee of the KDA, the Korean Association of Diabetes Dietetic Educators (KADDE), the Korean Dietetic Association, the Korean Nutrition Society, and the Korean Society of Clinical Nutrition formed a 12-member food exchange lists revision Task Force Team (TFT). Through 11 TFT meetings, food exchange lists were revised and expert opinions were collected at the KDA spring conference on May 13, 2023. In December 2023, the revised food exchange lists were incorporated into the “Guidelines for the Use of Food Exchange Lists for Diabetes Meal Planning, 4th ed. (2023).” This report introduces the revision process, content, and usage guidelines for the food exchange lists. The revision process of the food exchange list is illustrated in **Figure 1**.

REVIEW OF THE DIRECTION OF REVISION OF FOOD EXCHANGE LISTS

Review of food exchange lists system

When establishing a food exchange lists system, it is crucial to consider whether it accurately reflects domestic eating habits, its convenience and ease of use for nutrition education, its ability to support balanced meal planning, and its accommodation of diverse eating habits and preferences.

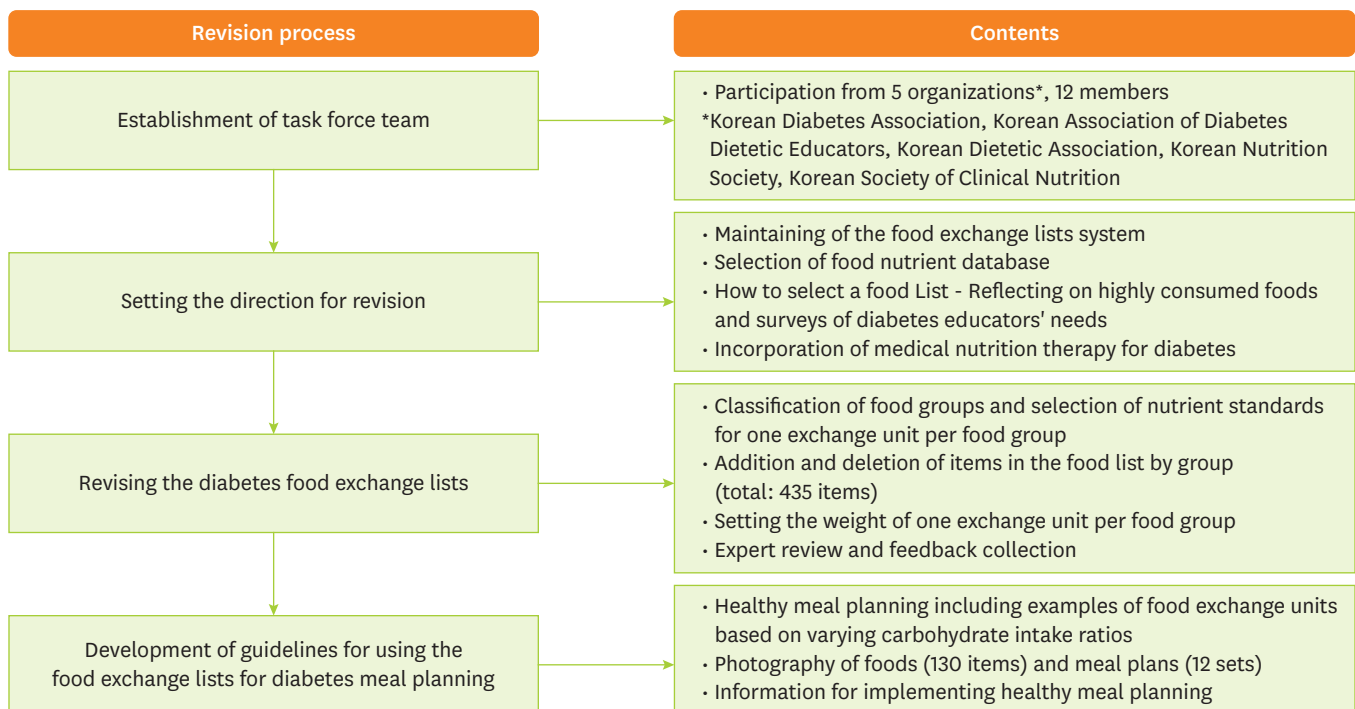


Figure 1. Overview of the revision process of food exchange lists for diabetes.

In the United States, the food exchange lists system started with the 4th revision in 1995 to facilitate application of the carbohydrate counting method [5]. Foods were broadly classified into 3 groups: carbohydrates, meat and meat substitutes, and fats. Carbohydrates were further subdivided into starch, fruits, milk, other carbohydrates, and non-starchy vegetables. Within their exchange system, one unit of carbohydrates equals 15 g of carbohydrates, allowing for interchangeable consumption [5,6]. In the 6th revision in 2008 [6], while maintaining similar food group classifications and nutrient standards, food subcategories within food groups were adjusted for ease of use. Additionally, alcohol, combination foods, fast foods, and free foods were included, expanding the list to over 700 items [7,8]. In Japan, a scoring method focusing on the convenience of energy calculation is used [9]. For example, in all 6 food groups (grains, fruits, fish, milk, fats, and vegetables), one exchange unit is set at 80 kcal. Foods that contribute to significant energy, such as ketchup, sugar, miso, and *mirim*, are limited to 0.5 units per day.

This system simplifies energy calculation because one exchange unit has the same energy value across all food groups. However, counting the amount of carbohydrates can be somewhat cumbersome. On the other hand, the current food exchange lists in Korea divide foods into 6 food groups with similar nutritional compositions, allowing for free exchange of foods with the same exchange units within the same food group. While this system is useful for planning or teaching a balanced diet based on daily energy requirements, it has limitations for counting carbohydrates because the nutrient content can vary among grains, milk, and fruits, making interchangeability challenging.

In light of these points, we considered reclassifying or adding food groups based on nutrients. However, since a major change to the food exchange lists system could cause significant confusion for both patients and educators involved in diabetes education, we decided to maintain the existing system, which emphasizes a balanced diet. To enable the use of carbohydrate counting methods, we have decided to provide detailed instructions in the dietary practice information section on how to access and interpret nutritional information, including nutrient contents of various foods.

Selection and review of food nutritional component standard database (DB)

The food nutritional composition DB used in the revision process is a critical standard for classifying food groups and determining the value of one exchange unit. To this end, we reviewed available DBs in Korea and decided to use the 10th revised edition of the National Standard Food Composition Table from the Rural Development Administration [10]. The Food Composition Table 10.0 DB was selected for its comprehensive inclusion of various foods distributed domestically, its accessibility and the ease of obtaining information via Internet. Using this DB, we calculated the average, standard deviation, maximum, and minimum values for nutrient content per 100 g and per one exchange unit, and compared and verified these values by matching them with foods in each existing food group.

Needs of educators

To incorporate opinions on the revision of food exchange lists and their utilization plans from nutritionists who provide nutrition education, we conducted an on-site survey for attendees of the KADDE academic conference held on July 21, 2022. We also conducted an email survey for non-attendees over approximately 9 days. There was a total of 102 participants. When asked about educational methods used in nutrition education, 58 (56.9%) participants reported using only the food exchange lists, while 39 (38.2%) participants reported using both the food exchange lists and the carbohydrate counting method.

We investigated requests for foods to be added or removed from the list to revise the food items in each food group. We also collected opinions on how to use the food exchange lists. Respondents indicated that it would be necessary to re-establish the one exchange amount for each food group. They also requested a detailed explanation of how to interpret and use nutritional labels, information on nutritional content for various dining out and intake methods, and examples of different meal planning approaches. Additionally, they sought detailed information on types of non-nutritive sweeteners, including their intake and use guidelines.

How to add to the food list

When revising the food exchange lists, we aimed to include as many food items as possible to meet nutritionists' demands for food diversification and adapt to changing market circumstances. We analyzed frequently consumed foods and those with high consumption based on diagnoses of diabetes, metabolic syndrome, obesity, and health behaviors in adults aged 19 years or older from the 2017–2019 Korea National Health and Nutrition Examination Surveys (KNHANES) [11]. Additionally, results of a survey on need for additional foods from diabetes education nutritionists were used to review and select foods to be added to each food group.

Medical nutrition therapy for diabetes

We reviewed 2021 diabetes care guidelines released by the KDA [12] and 2022 clinical nutrition recommendations by the American Diabetes Association [13] to incorporate them into the revision of the food exchange lists and utilization guidelines. Based on the nutritional recommendation that “carbohydrates should be consumed in the form of whole grains, vegetables, legumes, fruits, and dairy products rich in dietary fiber” and evidence supporting effects of dietary fiber in preventing diabetes, improving blood sugar levels, and reducing cardiovascular disease [14-16], foods containing 2.5 g or more of dietary fiber per one exchange unit in grains, vegetables, and fruits groups were labeled for easy identification. Additionally, vegetables with a carbohydrate content of 5 g or more per one exchange unit were highlighted in the group of vegetables, suggesting caution regarding excessive intake when carbohydrate restriction is necessary. As part of medical nutrition therapy, which advises that “foods rich in saturated fatty acids and trans fatty acids should be replaced with foods rich in unsaturated fatty acids,” foods with 2 g or more of saturated fatty acids per exchange unit in meat, fats, and milk groups were labeled. Based on the nutritional advice that “sodium intake should be limited to less than 2,300 mg per day” and evidence that reducing sodium intake helps lower blood pressure and delays the onset of cardiovascular disease and diabetic complications [17,18], foods with more than 100 mg of sodium per exchange unit in grains and vegetable groups were labeled. In the meat and meat substitutes group, salted seafood was included as a high-sodium food and flagged for consideration when planning meals.

ESTABLISHMENT AND REVISION OF THE FOOD EXCHANGE LISTS SYSTEM

Food group system and nutrient reference values for one exchange unit

The classification of the 6 food groups in the existing food exchange lists—grains, meat and meat substitutes, vegetables, fats and oils, milk, and fruits—was maintained. The meat group retained its existing classification into low fat, medium fat, and high fat categories to provide tailored clinical nutritional treatments for patients requiring fat intake control.

Table 1. Energy and macronutrient contents per exchange unit for each food group

Food group	Energy (kcal)	Carbohydrate (g)	Protein (g)	Fat (g)
Grains	100	23	2	-
Meat and meat substitutes				
Low-fat	50	-	8	2
Medium-fat	75	-	8	5
High-fat	100	-	8	8
Vegetables	20	3	2	-
Fats and oils	45	-	-	5
Milk				
Low-fat	80	10	6	2
Whole	125	10	6	7
Fruits	50	12	-	-

The milk group also maintained its classification into low-fat and whole milk, with low-fat milk listed first. The reference amount (representative value) of nutrients per 1 exchange unit by food group was reviewed based on the food composition table 10.0 DB. It remained unchanged (**Table 1**).

Addition of foods to the food exchange lists

Data from the 2017–2019 KNHANES [11] were used to select 14,538 adults aged 19 years or older as subjects. Their 24-hour recall data were analyzed to identify frequently consumed foods. Subjects were divided into groups based on whether they had been diagnosed with diabetes, metabolic syndrome, or obesity or based on their health behaviors. For high-frequency foods, those consumed by a large proportion of subjects more than once a day were analyzed, up to the top 60 items. For high-consumption foods, those with the highest average daily intake were analyzed and reviewed, up to the top 60 items. In a survey conducted with nutritionists in July 2022 to revise and utilize the food exchange lists, requests for foods to be added or removed were investigated and reviewed. Among foods requested for addition in 2 data sets, those without available nutritional information were excluded. Foods with very low consumption frequency or duplicates were removed, and foods requiring a change in food group were rearranged. As a result, 24 foods were removed from the existing list of 339 foods and 120 foods were added, bringing the total to 435 foods across 6 food groups (**Table 2**).

Setting the exchange unit amount for foods in each food group

For the existing food list, the nutrient content of one exchange unit was reviewed using the Food Composition Table 10.0 DB. If the nutrient content was similar to the reference nutrient content for one exchange unit by food group, the exchange amount was maintained. If there was

Table 2. The number of foods in the newly revised food exchange lists

Food group	Previous list	Deleted food	Added food	Revised list
Grains	57	1	19	75
Meat and meat substitutes				
Low-fat	53	1	16	68
Medium-fat	30	7	15	38
High-fat	18	6	9	21
Vegetables	85	5	24	104
Fats and oils	32	2	21	51
Milk				
Low-fat	1	0	3	4
Whole	5	0	2	7
Fruits	58	2	11	67
Total No. of foods	339	24	120	435

Table 3. Average energy and macronutrient values per exchange unit from each food exchange list

Food group	No. of foods (total: 435)	Energy (kcal)	Carbohydrate (g)	Protein (g)	Fat (g)
Grains	75	105.6 ± 14.0	21.6 ± 2.9	2.7 ± 1.4	0.9 ± 1.6
Meat and meat substitutes					
Low-fat	68	51.0 ± 9.6	1.4 ± 2.3	8.7 ± 2.3	1.0 ± 0.7
Medium-fat	38	78.7 ± 11.3	2.0 ± 2.9	7.8 ± 2.5	4.2 ± 1.3
High-fat	21	108.1 ± 20.2	0.9 ± 1.4	7.2 ± 2.1	8.1 ± 2.6
Vegetables	104	15.6 ± 8.4	3.3 ± 1.5	1.2 ± 0.6	0.2 ± 0.2
Fats and oils	51	47.2 ± 5.5	1.1 ± 1.0	0.8 ± 0.9	4.5 ± 0.9
Milk					
Low-fat	4	86.8 ± 3.9	11.5 ± 2.5	7.7 ± 1.1	1.0 ± 1.1
Whole	7	118.4 ± 20.5	10.2 ± 2.2	5.6 ± 1.4	6.1 ± 1.9
Fruits	67	48.4 ± 6.9	12.2 ± 1.7	0.7 ± 0.5	0.2 ± 0.3

Values are presented as mean ± standard deviation.

a discrepancy, the exchange amount was adjusted accordingly. For additional foods, the amount for one exchange unit was newly established using the Food Composition Table 10.0 DB. Foods in each food group and the amount for one exchange unit are presented in **Supplementary Tables 1-6**. Average nutrient content of foods by food group is shown in **Table 3**.

Grains

Grains were divided into rice, rice gruels, cereals and grains powder, noodles, potatoes/corns, rice cakes, bread, starch jelly, and others. Rice noodles (cooked) were removed from the existing 57 food items. Five types of noodles and 7 types of bread, which were particularly requested for addition, were newly added. Nineteen new food items were added to the group of grains, bringing the total to 75 food items. The average energy and nutrient contents of the revised group of grains were 105.6 ± 14.0 kcal, 21.6 ± 2.9 g of carbohydrates, 2.7 ± 1.4 g of protein, and 0.9 ± 1.6 g of fat. Considering nutrient contents of commonly consumed rice and porridge (103.6 kcal, 22.5 g of carbohydrates, 2.0 g of protein), the reference energy and nutrient contents (100 kcal, 23 g of carbohydrates, 2 g of protein) for one exchange unit in the existing group of grains was maintained. Foods with ≥ 2.5 g of dietary fiber per one exchange unit were marked for reference when selecting foods, while foods with ≥ 100 mg of sodium per one exchange unit were marked for consideration when planning meals to manage sodium intake.

Meat and meat substitutes

In the meat and meat substitutes group, we newly added offal such as tripe, large intestine, and rectum, as well as meats such as lamb and smoked duck. Additionally, 5 types of cheese were added to address the high demand for a greater variety of cheeses products. Foods with ≥ 50 mg of cholesterol per exchange unit and foods with ≥ 2 g of saturated fat were also marked for consideration when selecting foods.

The 'low-fat group' includes meat, fish, dried fish and fish products, salted fish, and other seafood. Tuna (which was moved to the medium fat group) was removed from the existing 53 types. Five types of fish—*Dorumuk*, croaker, Spanish mackerel, mackerel, and slender shad—were moved from the medium-fat to the low-fat group and 11 new foods were added, bringing the total to 68 foods. The energy and nutrient contents of one exchange unit in the low-fat meat group were maintained at 50 kcal, 8 g of protein, and 2 g of fat. The average energy and nutrient contents of the revised low-fat meat group were 51.0 ± 9.6 kcal, 1.4 ± 2.3 g of carbohydrates, 8.7 ± 2.3 g of protein, and 1.0 ± 0.7 g of fat.

The 'medium-fat group' is divided into meat, fish, processed products, eggs, beans and processed beans, and other seafood. From the existing 30 types, 5 items—*Dorumuk*, Spanish mackerel, and other types—were moved to the low-fat group, while saury and Pacific herring were moved to the high fat group and excluded. Tuna (moved from the low fat to the medium-fat group), chicken including skin, canned mackerel, and luncheon meat (moved from the high-fat to the medium-fat group) were included, along with 11 new foods, bringing the total to 38 foods. The energy and nutrient contents of one exchange unit in the medium-fat meat group were maintained at 75 kcal, 8 g of protein, and 5 g of fat. The average energy and nutrient contents of the revised medium-fat meat group were 78.7 ± 11.3 kcal, 2.0 ± 2.9 g of carbohydrates, 7.8 ± 2.5 g of protein, and 4.2 ± 1.3 g of fat.

The 'high-fat group' is divided into meat, fish, processed products, pulses products. Chicken including skin, canned mackerel, luncheon meat (moved to medium fat), dog meat, and Japanese eel (request for deletion by nutritionist) were excluded from the existing 18 types, and 7 new foods were added to include saury and pacific herring (moved from medium fat to high fat), bringing the total to 21 foods. The energy and nutrient contents of one exchange unit in the high fat meat group were maintained at 100 kcal, 8 g of protein, and 8 g of fat. The average energy and nutrient contents of the revised high-fat meat group were 108.1 ± 20.2 kcal, 0.9 ± 1.4 g of carbohydrates, 7.2 ± 2.1 g of protein, and 8.1 ± 2.6 g of fat.

Vegetables

Vegetables group were divided into vegetables, root vegetables, dried vegetables, vegetable juice, seaweed, mushrooms, kimchi, and pickled vegetables. Of existing 85 types of vegetables, 5 types, including coneflower, purple yam, konjac, and paprika (3 colors combined into one type), were excluded and 24 new types were added, bringing the total to 104 types. The energy and nutrient contents of one exchange unit in the vegetable group were maintained at 20 kcal, 3 g of carbohydrates, and 2 g of protein. The average energy and nutrient contents of the revised group of vegetables were 15.6 ± 8.4 kcal, 3.3 ± 1.5 g of carbohydrates, 1.2 ± 0.6 g of protein, and 0.2 ± 0.2 g of fat. Vegetables such as kudzu, water parsley, old pumpkin, sweet pumpkin, *Deodeok*, and *Doraji* with ≥ 5 g of carbohydrates per one exchange unit, are marked to caution against excessive intake, particularly when carbohydrate restriction is necessary to control overall nutrient composition.

Fats and oils

Fats and oils were divided into nuts and seeds, solid oils, dressings, vegetable oils, and others. In addition to the existing 32 types of food, white sesame (duplicate entry for sesame) and Italian dressing (no available DB) were excluded and 21 new types of food were added, bringing the total to 51 types. The energy and nutrient contents of one exchange unit for the group of fats and oils were maintained at the existing 45 kcal and 5 g of fat. The average energy and nutrient contents of the revised group of fats and oils were 47.2 ± 5.5 kcal, 1.1 ± 1.0 g of carbohydrates, 0.8 ± 0.9 g of protein, and 4.5 ± 0.9 g of fat. Foods with ≥ 2 g of saturated fatty acids per one exchange unit were marked. Foods high in saturated fatty acids are recommended to replace with those rich in monounsaturated fatty acids and omega-3 fatty acids.

Milk

Three types of plain liquid yoghurt (thick fermented), plain curd yoghurt, and skimmed milk powder were added to the existing food type of low-fat milk group. Greek yogurt and goat's milk were added to the existing 5 food types of the whole milk group. The name of

lacto-milk was changed to lactose-free milk. Therefore, the milk group consisted of 11 food items in total, with 5 additional items added to the existing 6 items. The energy and nutrient contents per exchange unit remained unchanged for the low-fat milk group (80 kcal, 10 g of carbohydrates, 6 g of protein, 2 g of fat) and the whole milk group (125 kcal, 10 g of carbohydrates, 6 g of protein, 7 g of fat). Foods with ≥ 2 g of saturated fatty acids per one exchange unit were marked. The average energy and nutrient contents of the low-fat milk group were 86.8 ± 3.9 kcal, 11.5 ± 2.5 g of carbohydrates, 7.7 ± 1.1 g of protein, and 1.0 ± 1.1 g of fat. For the whole milk group, the average energy and nutrient contents were 118.4 ± 20.5 kcal, 10.2 ± 2.2 g of carbohydrates, 5.6 ± 1.4 g of protein, and 6.1 ± 1.9 g of fat.

Fruits

Fruits were divided into fresh fruit, dried fruit, canned fruit, and juice. Olives (moved to the fat group) and dried olives were excluded from the existing 58 types. Eleven new foods, including 8 fresh fruits and 3 dried fruits, were added to account for the increased variety of imported fruit items and additional requests, bringing the total to 67 foods. The energy and nutrient contents of one exchange unit in the group of fruits were maintained at the existing 50 kcal and 12 g of carbohydrates. Foods with ≥ 2.5 g of dietary fiber per one exchange unit were marked. The average energy and nutrient contents of the revised group of fruits were 48.4 ± 6.9 kcal, 12.2 ± 1.7 g of carbohydrates, 0.7 ± 0.5 g of protein, and 0.2 ± 0.3 g of fat.

GUIDELINES FOR USING FOOD EXCHANGE LISTS FOR HEALTHY MEAL PLANNING

To enhance understanding and utilization of the food exchange lists, we planned to publish a usage guide. We reviewed results of a survey on how to use food exchange lists, selected foods for photography by food group, and prepared dietary examples. Among food photos included in the 3rd edition of the Korean food exchange lists for diabetes [2], we decided to retain photos of foods with the same one-unit exchange amount. We also photographed 130 food items and 12 dietary examples from the list of changed or newly added foods. Before taking pictures, we captured images from various angles and selected the angle that best allowed for estimating the amount (plates: 30°, bowls: 45°, glass cups: 10°, others: 45°, etc.). For grains and powdered products, we used a glass cup and our hands in the photos to make it easier to estimate the amount. We also reviewed and selected content on various topics to practice healthy eating. Contents of the user guide are divided into 3 parts. Part 1 introduces the food exchange lists. Part 2 provides a healthy meal plan for diabetics. Part 3 offers information for implementing the diet. In part 1, the food exchange lists are explained, including the exchange unit amount for each food group, accompanying photos, and considerations for using foods from each group. In part 2, various meal plans are introduced using the food exchange lists for healthy eating. Part 3 provides nutritional information necessary for practicing healthy eating and explains in detail how to use it. Given limitations in real-time updates for rapidly changing information, we aimed to provide detailed guidance on how to access and interpret the data.

HEALTHY MEAL PLANNING

The medical nutrition therapy guidelines for diabetes recommend that the macronutrient intake ratio should be individualized based on patient's medical condition, metabolic goals,

Table 4. Examples of using food exchange units considering total energy and the proportion of energy from carbohydrates for adults with diabetes

Carbohydrate proportion	Total energy intake (kcal)	Food group distribution (exchange unit)						Nutrient composition										
		Meat and meat substitutes		Vegetables		Fats and oils		Milk		Fruits		Energy (kcal)	Carbohydrate (g)	Protein (g)	Fat (g)	Carbohydrate (%)	Protein (%)	Fat (%)
		Low-fat	Medium-fat	Low-fat	Whole	Low-fat	Whole	Low-fat	Whole									
40%–45%	1,500	5	4	7	6	1	0	1	1,498	158	86	58	42.2	23.0	34.8			
	1,800	6	4	8	7	2	0	1	1,795	194	104	67	43.2	23.2	33.6			
	2,100	7	5	9	8	2	0	2	2,085	232	116	77	44.5	22.3	33.2			
50%–55%	1,500	7	3	7	4	0	1	1	1,526	204	74	46	53.5	19.4	27.1			
	1,800	8	3	8	5	1	1	1	1,823	240	92	55	52.7	20.2	27.1			
	2,100	9	3	8	6	1	1	2	2,093	275	102	65	52.5	19.5	28.0			
60%–65%	1,500	8	2	7	3	0	1	1	1,504	227	68	36	60.4	18.1	21.5			
	1,800	9	2	8	4	0	1	2	1,767	265	80	43	60.0	18.1	21.9			
	2,100	11	2	9	5	1	1	2	2,114	324	92	50	61.3	17.4	21.3			

current eating habits, and personal preferences [12]. Many studies have demonstrated that reducing carbohydrates intake is effective in improving blood sugar levels, with meta-analyses and systematic reviews showing consistent results. Although prospective studies on appropriate carbohydrates intake in Korean adult diabetic patients are lacking, considering that carbohydrates account for approximately 65%–70% of total energy intake, recommending a reduction in carbohydrates intake may help improve blood sugar levels. Dietary patterns such as the Mediterranean diet, Dietary Approaches to Stop Hypertension diet, and low-carbohydrate diet have been proven to offer long-term benefits and safety in improving blood sugar levels and preventing cardiovascular disease [13]. Therefore, considering patient’s usual eating habits, we provided examples of exchange unit distribution from the food exchange lists based on various carbohydrate intake ratios. This was designed to facilitate easy application when planning macronutrient intake ratios and meal patterns within a practical range (Table 4). Additionally, we presented examples of various diets and meal plans (Supplementary Table 7) for individualized meal planning for patients.

CONCLUSIONS

A food exchange list is a tool developed to assist with intake assessment, meal planning, and nutrition education in the implementation of medical nutrition therapy. It categorizes commonly consumed foods into 6 food groups based on their similar nutritional compositions. The 2023 revision of the food exchange lists aims to help patients plan and have healthy meals more effectively by taking into account the evolving eating environment, diverse dietary habits, and treatment approaches [19]. Nutrition educators must strive to fully understand and actively utilize food exchange lists to help patients maintain a high-quality diet and follow individualized meal plans.

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SUPPLEMENTARY MATERIALS

Supplementary Table 1

Grains and their exchange unit amounts

Supplementary Table 2

Meat and meat substitutes and their exchange unit amounts

Supplementary Table 3

Vegetables and their exchange unit amounts

Supplementary Table 4

Fats and oils and their exchange unit amounts

Supplementary Table 5

Milk and dairy products and their exchange unit amounts

Supplementary Table 6

Fruits and their exchange unit amounts

Supplementary Table 7

Example of a one-day meal plan for a 1,800 kcal diet with 50%–55% of total energy from carbohydrates

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