Revision of the Reference Weight of Food Portion of Foods Frequently Consumed in Japan: The Tools for Dietary Surveys of the National Health and Nutrition Survey

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ABSTRACT

Objective: In the dietary survey of the National Nutrition Survey (NNS) and National Health and Nutrition Survey (NHNS), which has been conducted for more than 70 years, the reference weight of food portion is indispensable for accurately assessing the dietary intake. Thus, we summarized the history of the food composition table and the food number lists focusing on the reference weight of food portion, and the latest revision of the reference weight of food portion.

Methods: We reviewed the articles, laws, and the report of the results and webpages of NNS and NHNS. Additionally, we outlined the chronological flow of determining the latest reference weight of food portion.

Results: The Standard Tables of Food Composition in Japan have been used for nutrient intake calculation for NNS (1945 to 2002) and NHNS (2003-). In accordance with the revision of the Standard Tables of Food Composition in 2000, the food number lists used in the NNS were significantly revised, and the reference weight of food portion lists were added. The number of the foods listed as the reference weight of food portion has been increasing with each revision, as 440 were indicated as the reference weight of food portion in 2019's latest revision. Additionally, it was decided that the reference weight of food portion is indicated as a wide range.

Conclusions: It is important to provide a reference weight of food portion to assess dietary intake in a nationwide dietary survey and necessary to regularly revise the reference weight of food portion.

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Key words: reference weight of food portion, food composition table, National Health and Nutrition Survey, food number lists, Japan

I. Introduction

The National Nutrition Survey (NNS) in Japan has been annually conducted since 1945 and was renamed the National Health and Nutrition Survey (NHNS) in 2003. These surveys have been used to monitor the nutrient intake of Japanese people for over 70 years. The initial goal of the NNS was to monitor the nutritional quality of the diets of Japanese people who intended to acquire food supplies from foreign countries. Furthermore, the NNS was conducted to improve the population’s dietary habits and improve national physique. The survey was conducted to maintain and promote populational health since 1969. Presently, this survey is conducted to monitor the physical, lifestyle, and nutritional status of about 15,000 Japanese people (about 5,700 households) aiming to maintain and improve the population’s health by preventing increase in the prevalence of lifestyle-related conditions such as diabetes. Long-term monitoring of health, lifestyle, and the food and nutrition status of populations is essential to develop and evaluate national and local health policies.

The dietary survey in the NNS or NHNS estimates the nutrient and food intake per person, and is conducted by local public health centres under the supervision of the Ministry of Health, Labour and Welfare (Tokyo, Japan).
The recorded number of days of diet used to be 3 to 5 until 1994; however, it has been reduced to one day since 1995. Additionally, only the total amount of household meals were recorded until 1994; however, proportional proration (which asks the proportion of foods shared among family members) was introduced in 1995 to estimate nutrient intake by gender and age group. To briefly describe the current diet record method, the main household record-keepers (members who are usually responsible for preparing meals) were instructed to weigh all foods and beverages consumed by the household members along with the amount of food waste and leftovers, and use recording forms to record their names and weights. Additionally, the record-keepers recorded the approximate proportions of the food consumed by each household member when they used a shared dish to estimate individual intake. If weighing was impossible due to eating out or other factors, they recorded the consumed portion size or quantity of foods and details of any leftovers. Trained fieldworkers (mainly registered dieticians) visited each household and checked for any missing information and/or errors. In accordance with the survey manual, the trained fieldworkers converted the portion sizes estimates or food quantities into food weights and coded each food item according to the reference weight of food portion table in the NNS and NHNS food number lists, based on the Standard Tables of Food Composition in Japan to calculate energy and nutrients intake. Simply put, to convert the foods and dishes described as the reference weight of food portion into appropriate food weight, is essential for increasing the accuracy of estimating the nutrients and food group intake of Japanese people. The food composition table, which is the basis of the food number lists, has been continuously revised for the following reasons: the clarification of necessary nutritional components and measurement methods with medical and nutritional advances, changes in analysis methods recommended by FAO and others due to improvements in analysis methods, reflecting changes in ingredients due to new distributed foods, breed improvement and cooking have long been reported to be necessary, and foods that have more opportunities to eat over the years. As a result, the food number lists contains a list of the reference weight of food portion of commercially available foods and seasonings, since 2001.

This article aims to summarize both the reference weight of food portion history based on the history of the food number lists and the inclusion of the Standard Tables of Food Composition in Japan, and the latest revision of the reference weight of food portion.

II. Method

We investigated and summarized the history of the NNS and NHNS focusing on the food number lists and the Standard Tables of Food Composition in Japan to calculate the nutrients intake, by reviewing the articles, laws, web pages, and official reports of the NNS and NHNS. Additionally, we outlined the flow of determining the latest reference weight of food portion with reference to the Standard Tables of Food Composition in Japan, books that list the portion size of food used for cooking, and recipe books.

III. Results

1. The history of the food number lists focusing on the reference weight of food portion and the Standard Tables of Food Composition in Japan

Figure 1 shows the history of the Standard Tables of Food Composition in Japan, the food composition table used for calculating the nutrient intake of people in the NNS and NHNS, and the history of the revision in the reference weight of food portion used to encode the dietary record. The Food Ingredient List begins with the Comprehensive list of foods in Japan published by Tadasu Saiki in 1931. Its name was changed to Standard Tables of Food Composition in Japan in 1950, following the name Provisional Standard Food Nutritional Value Analysis table in 1947. Subsequently, the Standard Tables of Food Composition was changed to Standard Tables of Food Composition in Japan (a revised version), Standard Tables of Food Composition in Japan (third edition), Standard Tables of Food Composition in Japan (fourth edition), Standard Tables of Food Composition in Japan (fifth edition), Standard Tables of Food Composition in Japan (expanded fifth edition), and Standard Tables of Food Composition in Japan, 2010 respectively. The Standard Tables of Food Composition in Japan (seventh edition) published in 2010.
Figure 1 Revision of the reference weight of food portion along with history of the food composition table as the base of calculating nutrients intake in the "National Health Nutrition Survey" and "National Health and Nutrition Survey"
Figure 1 (continued)

- "Standard Tables of Food Composition in Japan (fourth edition)" was published. (Number of listed foods: 1621)
- "Standard Tables of Food Composition in Japan (fifth edition)" was published. (Number of listed foods: 1882)
- "Standard Tables of Food Composition in Japan (expanded fifth edition)" was published. (Number of listed foods: 1878)
- "Standard Tables of Food Composition in Japan, 2010" was published. (Number of listed foods: 1878)
- "Standard Tables of Food Composition in Japan (seventh edition)" was published. Since then, supplements are published every year. (Number of listed foods: 2191 (in 2015))
- "Standard Tables of Food Composition in Japan (seventh edition)" was published. (Number of listed foods: 2294 (in 2018))

- Load average composition table by food group created based on past survey data.
- A list of the reference weight of food portion of foods conversions was used.
- The reference weight of food portion of foods is listed in the food number table.
- Some foods that are often eaten (such as cooked rice) have been added.
- Revision based on food composition table and books that measure the weight of commercial products, etc.
| Food Group               | -2000 | 2001-2002 | 2003-2018 | 2019-- |
|-------------------------|-------|-----------|-----------|--------|
| Cereals                 | 16    | 30        | 34        | 40     |
| Potatoes and Starches   | 9     | 9         | 9         | 7      |
| Pulses                  | 12    | 11        | 11        | 10     |
| Nuts and seeds          | 3     | 5         | 5         | 9      |
| Vegetables              | 61    | 83        | 83        | 77     |
| Pickled vegetables      | 6     | 7         | 7         | 6      |
| Fruits                  | 32    | 39        | 39        | 44     |
| Mushrooms               | 9     | 11        | 11        | 12     |
| Seaweeds                | 9     | 9         | 9         | 6      |
| Fish and shellfish      | 83    | 39        | 39        | 38     |
| Meat                    | 11    | 9         | 10        | 7      |
| Eggs                    | 6     | 7         | 7         | 6      |
| Dairy products          | 11    | 21        | 21        | 22     |
| Confectioneries         | 41    | 59        | 59        | 59     |
| Beverages               | 18    | 11        | 15        | 35     |
| Sugars and sweeteners†  | 8     | 13        | 15        | 6      |
| Fats and oils†          | 4     | 9         | 51        | 5      |
| Seasonings and spices†  | 34    | –         | –         | 51     |

*† Three food groups (sugars and sweeteners, fats and oils, and seasonings and spices) were listed together in one from 2001 to 2018.
2015 is the current version, with yearly supplements being published every year.

In the NNS and NHNS, the food composition table used for the calculation of the nutrient intake has been revised. Since the Provisional Standard Food Nutritional Value Analysis Table was used for calculating nutrients intake in 1947, the Standard Tables of Food Composition used for calculating nutrients intake had changed as shown in Figure 1, with each revision of the Standard Tables of Food Composition up to the third revised version. Thereafter, the NNS’s own Load Average Composition Table by Food Group was created based on past survey data and was used to calculate nutrient intake from 1971 to 1987. The Standard Tables of Food Composition in Japan (fourth edition) were re-used to calculate nutrient intake in 1988 and the Food Composition Table used for calculating nutrient intake has been changed by the revision of the Food Composition Table to date. Until the year 2000, the food number used in the Standard Tables of Food Composition and the food number used in the food number lists of NNS were different and the number of foods listed in the food number lists of NNS \( (n = 1,064) \) was less than those listed in Standard Tables of Food Composition \( (n = 1,621) \). This has been a factor of deteriorating the accuracy of nutritional value calculation. The fifth edition of the Standard Tables of Food Composition, revised in 2000, was used for calculating nutrient intake in the NNS from 2001. At that time, the food number lists used in the NNS had been revised as well, and the food numbers in the Standard Tables of Food Composition and the food number lists in the NNS were equal. At the revision of the food number lists in 2001, the reference weight of food portion, which had been distributed as a food standard amount conversion table until that time, was initially included in the food number lists.

The food number lists indicate the food number and wastage rate (proportion of peels, seeds, and other food components either inedible and wasted), weight change rate (percent change in food weight after boiling or roasting), and the reference weight of food portion used for the NNS and NHNS nutritional status surveys since 2001. The following foods listed in the food composition table are not included in the food number lists because they are not suitable for use in the NNS: foods mainly used as raw materials for food processing, foods that are not normally marketed or are available in small quantities or are considered to be infrequently used at home, cooked food such as “fried” and “oiled”, foods listed in the Cooked and Processed Foods group in the Food Composition Table (seventh edition) excluding corn cream soup (powder and retort) and Matsumae pickles, and foods that are likely not to be available at the time of the survey due to seasonal reasons. Of the foods not listed in the Standard Tables of Food Composition in Japan, 30 are frequently observed in the NNS and NHNS, including cream stew roux, noncaloric coke, and vegetable juice. Each has its own food number so that their nutritional value can be calculated.

Until 2000, a list of the reference weight of food portion of foods conversions was distributed to local investigators for reference in food coding separately from the food composition table. In a list of the reference weight of food portion of foods conversions, the reference weight of food portion of 18 food groups (cereals, potatoes and starches, pulses, nuts and seeds, vegetables, pickled vegetables, fruits, mushrooms, seaweeds, fish and shellfish, meat, eggs, dairy products, confectioneries, beverages, sugars and sweeteners, fats and oils, and seasonings and spices) were listed. The number of foods listed in the list of the reference weight of food portion of foods conversions is shown in Table 1. The overall number of food items was 373, with fish and shellfish (83 food items) being the most listed group. At the revision of the food number lists in 2001, the reference weight of food portion was included in the food number lists and revised. The list now had 401 food items. Items had been added mainly in the cereal (from 16 to 30 food items), vegetable (from 61 to 83 food items), fruit (from 32 to 44 food items) and dairy product (from 11 to 21 food items) groups. Moreover, items from the fish and shellfish (from 83 to 38 food items) group had been removed, and the number of reference weight of food portion listings has been reduced from 102 in the 2000 edition to 45 in the 2019 edition. A partial review was made in 2003 to increase the number of listed cereals (cooked rice and others). In addition, the reference weight of food portion has been greatly revised in 2019, resulting in the largest list yet, with 440 food items. Beverages are the only listings to have increased significantly in this revision.
2. The latest revision of the reference weight of food portion

Reviews of the reference weight of food portion have been conducted both to improve efficiency and to standardize the NNS and NHNS. For example, Yoshita et al. reported the development of the tool for the reference weight of food portion\textsuperscript{12}. However, the reference weight of food portion listed in the food number lists has not been significantly revised for the past 20 years. Energy and nutrient intake have changed slightly over the same time period, according to NNS and NHNS results\textsuperscript{13}. Therefore, the reference weight of food portion of food has been revised using the Standard Tables of Food Composition in Japan (seventh edition)\textsuperscript{10} and 17 books regarding the food portion size in Japan or collection of recipes used in ordinary Japanese households\textsuperscript{14~30}.

The highest priority to determine the reference weight of food portion value is adopted when the weight of food is described in the Standard Tables of Food Composition in Japan (seventh edition)\textsuperscript{10}. If not listed in the aforementioned tables, it is based on 17 books that list the portion sizes of meals and recipes in Japan used in ordinary households\textsuperscript{14~30}. If the food weight value is less than half or 1.5 times higher than the other values per serving, it was excluded as an outlier. In addition, liquid foods which need to be taken into account use different units of measurement, as 100 cc is not equal to 100 g (milk, alcohol) and seasonings are different in packaging units across companies. Thus, the reference weight of food portion is indicated per 100 cc, except in cases where it is indicated per teaspoon, tablespoon, and cup. This revision resulted in 440 food items being included in the food number lists.

Table 2 shows the latest reference weight of food portion of main foods and their changes over the years. The

| Cereals | ~2000 | 2001~2002 | 2003~2018 | 2019~ |
|---------|-------|-----------|-----------|-------|
| Rice, one go | 150 | 150 | 150 | 150 |
| Cooked rice | 150 | 150 | 150 | 150 |
| 1 cup of medium rice bowl | – | – | 140 | 150 |
| 1 cup of big rice bowl | – | – | 230 | 200 |
| Rice cake, a piece | 50 | 50 | 50 | 50 |
| White bread | 150 | 150 | 150 | 150 |
| a loaf of bread | 360 | 360 | 360 | 360 |
| four-slice loaf | 90 | 90 | 90 | – |
| five-slice loaf | – | – | – | 70 |
| six-slice loaf | 60 | 60 | 60 | 60 |
| eight-slice loaf | 45 | 45 | 45 | 45 |
| Crescent roll, a piece | 40 | 40 | 40 | 30~40 |
| Boiled udon, one serving | 240 | 230 | 230 | 180~200 |
| Boiled soba, one serving | 180 | 200 | 200 | 160 |
| Raw chinese noodle, one serving | 130 | 120 | 110~130 | 110~120 |
| Pot noodle, one serving | – | 80 | 80 | 75~80 |
| Dried pasta | 100 | 100 | 100 | 80~100 |
| Potatoes and Starches | | | | |
| Konjac | 250 | 250 | 250 | 200 |
| Potato | 150 | 150 | 150 | 100~150 |
| Pulses | | | | |
| Deep-fried tofu | 20 | 30 | 30 | 15~30 |
| Tofu | 300 | 300 | 300 | 300 |
| Nuts and seeds | | | | |
| Sesame, a teaspoon | 3 | 3 | 3 | 3 |
| Sweet chestnut | 20 | 13 | 20 | 20~30 |
| Vegetables | | | | |
| Asparagus | 10~20 | 20~30 | 20~30 | 20~30 |
| Cabbage, a leaf | 60 | 50 | 50 | 50~80 |
| Carrot | 250 | 150 | 150 | 150~200 |
| Cucumber | 150 | 100 | 100 | 100 |
| Green soybean | 2 | 3 | 3 | 2~3 |
| Japanese radish | 1000 | 1000 | 1000 | 800~1200 |
| Onion | 200 | 200 | 200 | 150~200 |
| Tomato | 150 | 170 | 170 | 150~200 |
| Food Group                        | Example                          | 100 g (g) | 200 g (g) | 300 g (g) | 400 g (g) |
|----------------------------------|----------------------------------|-----------|-----------|-----------|-----------|
| Pickled vegetables               | Pickled radish, a piece          | 10        | 6–10      | 6         | 6         |
|                                  | Pickled ume                       | 10        | 13        | 13        | 7–10      |
| Fruits                           | Apple                             | 200       | 280       | 250       | 250–300   |
|                                  | Orange                            | 200       | 190       | 190       | 130–200   |
|                                  | Persimmon                         | 200       | 200       | 200       | 150–200   |
|                                  | Tangerine                         | 70        | 110       | 110       | 100       |
| Mushrooms                        | Shiitake mushroom                 | 20        | 13        | 13        | 10–20     |
| Seaweeds                         | Roasted seaweed                   | 3         | 3         | 3         | 3         |
| Fish and shellfish               | Boiled fish paste *(kamaboko)*    | 200       | 145       | 145       | 120–180   |
|                                  | Canned tuna                       | –         | –         | 80        | 70        |
|                                  | Horse mackerel                    | 150       | 120       | 120       | 120–160   |
|                                  | Salmon                            | 80        | 80–100    | 80–100    | 80–100    |
|                                  | Unshelled asari clam              | 20        | 8         | 10        | 6–10      |
|                                  | Unshelled shiba shrimp            | 10        | 8–10      | 8–10      | 8         |
| Meat                             | First segment of a chicken's wing | –         | 50        | 50        | 50–60     |
|                                  | Bacon                             | 20        | 17        | 17        | 15–20     |
|                                  | Vienna sausage                    | 15        | 20        | 20        | 15–20     |
| Eggs                             | Egg                               | 50        | 50        | 60        | 49–54     |
| Dairy products                   | Cheese, a slice                  | –         | 18        | 18        | 17–20     |
|                                  | Cheese, a piece                   | 40        | 25        | 25        | 18–20     |
|                                  | Milk, 200 ml                      | –         | 206       | 206 (210)| –         |
|                                  | Milk, 100 ml                      | –         | –         | –         | 103.2     |
| Confectioneries                  | Candy                             | –         | 3–5       | 3–5       | 3–5       |
|                                  | Castilla                          | 40        | 50        | 50        | 40–50     |
|                                  | Cookie                            | 13        | 10        | 10        | 7–10      |
|                                  | Cream puff                        | 60        | 70–100    | 70–100    | 60–100    |
|                                  | Doughnut                          | 50        | 65        | 65        | 40–70     |
|                                  | Potato chips                      | 95        | 90        | 60        | 60        |
|                                  | Pudding                           | –         | 90        | 80        | 70–100    |
|                                  | Rice cracker                      | 12        | 12        | 12        | 10–15     |
|                                  | Stick of dumplings with bean jam  | 80        | 80        | 60        | 50–70     |
|                                  | Steamed bun with meat filling     | 70        | 100       | 100       | 80–110    |
| Beverages                        | Beer, a can 350 ml                | 330       | 353       | 354       | –         |
|                                  | Beer, 100 ml                      | –         | –         | –         | 100.8     |
|                                  | Cocoa, a teaspoon                 | 2         | 2         | 2         | 2         |
|                                  | Instant coffee, a tablespoon      | –         | 3         | 3         | 6         |
|                                  | Sake, one go                      | 180       | 180       | 180       | 180       |
| Sugars and sweeteners            | Honey, a teaspoon                 | 7         | 7         | 7         | 7         |
|                                  | Sugar, a teaspoon                 | 3         | 3         | 3         | 3         |
| Fats and oils                    | Butter, a teaspoon                | 4         | 4         | 4         | 4         |
|                                  | Oil, a teaspoon                   | 4         | 4         | 4         | 4         |
| Seasonings and spices            | Soy sauce, a teaspoon             | 6         | 6         | 6         | 6         |
|                                  | Salt, a teaspoon                  | –         | 6         | 6         | 6         |
|                                  | Vinegar, a teaspoon               | –         | 6         | 6         | 6         |
|                                  | *Miso*, a teaspoon                | –         | 6         | 6         | 6         |
|                                  | Ketchup, a teaspoon               | 6         | 5         | 5         | 5–6       |
|                                  | Mayonnaise, a teaspoon            | 5         | 4         | 4         | 4         |

The values in parentheses have been temporarily changed.
portion size of commercial foods such as crescent, noodles (boiled udon, boiled soba, and raw Chinese noodles), cheese pieces, and confectioneries (cookie, doughnut, potato chips, and stick of dumplings with bean jam etc.) was decreasing with time while there was no significant change in the reference weight of food portion of raw ingredients such as vegetables, fruit, fish and shellfish, and meat. Additionally, raw foods such as vegetables, fruits, fish and shellfish, and meat have different individual weights, while the weight of commercially available foods is also different for each company. Thus, it was decided that the reference weight of food portion of foods has a wide range.

IV. Discussion

This article aims to summarize the history of the food number lists focusing on the reference weight of food portion and the Standard Tables of Food Composition in Japan, and the latest revision of the reference weight of food portion.

When the Standard Tables of Food Composition in Japan (fifth edition) was revised in 2000, the food number lists used in the NNS and NHNS were significantly revised, and the food numbers in the food composition table and the food number lists were unified. Changes in the cooking of foods were taken into account31), and the accuracy of nutrient intake estimation was improved even when conducting a dietary survey in the Standard Tables of Food Composition in Japan (fifth edition). Additionally, each revision saw an increase in the number of food items listed in the Standard Tables of Food Composition in Japan19, 32), and data used for calculating nutrient intake has been returned to the Standard Tables of Food Composition in Japan since 198833). Due to these factors, the food numbers in the Standard Tables of Food Composition in Japan and food number lists have been unified, improving the efficiency of future surveys.

The number of fish and shellfish food items (83 foods) had been the largest among foods listed as the reference weight of food portion until 2000. However, the number has decreased to about half since the 2001 revision. This might reflect a limitation in the types of fish used at home34). It might also be because fish fillets are almost identical regardless of the type, and only fish commonly used by the Japanese, such as salmon35), were recorded. In 2019, guideline listings have also been reduced to about 1/3 of their number in 2000. It may be the result of choosing to indicate width-specific data, although the size of the fish was indicated on a scale of small to large until 2000.

The number of the food items listed with their standard weights has been increasing with each revision. One reason for this may be the increased number of foods listed in the food composition table such as canned vegetables and fruits. The food composition list contains about 2,300 food items as of 201835). In addition, the bread and dairy intake pattern has been reported to increase over time among the Japanese36). These factors may have contributed to the increase in the reference weight of food portion of vegetables, fruits, and dairy products. It is additionally reported that 41.3% of men and 29.2% of women regularly use take-away boxes and prepared food items37). Regarding take-away in the dietary record, the number of indications in the approximate amount increases, so it is possible that the number of foods in the approximate amount increased as well. Moreover, the NHNS is conducted in 300 regions nationwide every November (the enlarged survey every 4 years)4). It has been reported that indicating the reference weight of food portion is one of the best standardizing measures for a dietary record38). In other words, the reference weight of food portion is one of the most important tools in standardizing a national survey, and as a result, the number of foods listed in the reference weight of food portion may increase.

The reference weight of food portion has decreased among noodles, dairy products, and confectioneries over the years; however, it has remained the same among raw ingredients such as vegetables, fruits, fish and shellfish, and meat. In Japan, shrinkflation is observed in noodles, dairy products and sweets for each serving39), and its effects are visible in each revision. To check market trends and determine the timing of revision of the reference weight of food portion may be important for the implementation of a dietary survey to more accurately assess the nutrient intake.

The number of foods listed in the food composition table has increased with each revision, and 2,294 foods are now listed. However, the number of foods listed as the reference weight of food portion in the food number lists is about 20%, which is by no means sufficient. In addition,
the weight of commercially available foods is also different for each company, so it cannot be said that the existing literature has covered it sufficiently. Foreign countries such as the United States and Australia/New Zealand, have created databases that integrate nutritional ingredients and the reference weight of food portion in cooperation with companies and other organizations and publish them on the Web. It is also updated every two years. If the reference weight of food portion can be shown in Japan like in these countries by cooperating with companies and other organizations, it will be possible to more accurately assess the nutrient intake not only in the NHNS but also in the situation of conducting large-scale dietary surveys.

V. Conclusion

It is important to provide a reference weight of food portion to improve the assessment of dietary intake when conducting a nationwide dietary survey. Foods and portion sizes consumed among the population may change due to the current trends in the world. Therefore, we conclude that revising the reference weight of food portion on a regular basis is necessary.

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Conflicts of Interest Statement

There are no conflicts of interest to declare.

References

1) National Institute of Health and Nutrition: Current state of national nutrition (in Japanese), https://www.nibiohn.go.jp/eiken/choza/kokumin_eiyou/index.html (Accessed April, 16, 2020)
2) Yoshiike, N., Ichimura, K.: The National Health and Nutrition Survey in the promotion and evaluation of health policies: Its role and history as a long-term health-monitoring tool, J. Natl. Inst. Public. Health, 61, 388–398 (2012)
3) Ministry of Health, Labour and Welfare: The National Health and Nutrition Survey (in Japanese), https://www.mhlw.go.jp/bunya/kenkou/kenkou_eiyou_chousa.html (Accessed April, 16, 2020)
4) Ministry of Health, Labour and Welfare: The National Health and Nutrition Survey in Japan, 2017 (2019) Ministry of Health, Labour and Welfare, Tokyo (in Japanese)
5) Yoshiike, N., Iwaya, M., Otani, Y., et al.: Error sources in data handling process of the National Nutrition Survey, Japan, and possible measures for lessening the errors, J. Jpn. Soc. Nutr. Food. Sci., 31, 57–65 (1998) (in Japanese)
6) FAO: FAO food and nutrition paper 77: Food energy-methods of analysis and conversion factors (2003) FAO, Rome
7) Saeki, T., Higuchi, T., Kondo, M., et al.: Effect of different ways of cooking on the constituents of food: Report of the imperial government institute for nutrition (1936) The Imperial Government Institute for Nutrition, Tokyo (in Japanese)
8) Taïra, H.: Standard Tables of Food Composition in Japan (fifth revised version), J. Cookery. Sci. Jpn., 31, 61–64 (1998) (in Japanese)
9) Yasui, A.: The outline of new food composition tables, J. Integr. Stud. Diet Habits., 25, 9–12 (2014) (in Japanese)
10) Science and Technology Agency: Standard Tables of Food Composition in Japan, 2015 (2015) Ministry of Education, Culture, Sports, Science and Technology, Tokyo (in Japanese)
11) Saito, A., Okada, E., Matsumoto, M., et al.: Impact of updated standard tables of food composition on nutrient intakes in Japan, J. Food. Comp., 79, 5–11 (2019)
12) Yoshita, K., Arai, Y., Nozue, M.: Book of food portion sizes 2009 (in Japanese), https://www.nibiohn.go.jp/eiken/choza/pdf/scale2009_2013ver.pdf (Accessed April, 15, 2020)
13) Saito, A., Imai, S., Hut, N.C., et al.: The trends in total energy, macronutrients and sodium intake among Japanese: findings from the 1995-2016. National Health and Nutrition Survey, Br. J. Nutr., 120, 424–434 (2018)
14) Makino, N.: Energy at a Glance (food and cooking data), fourth revised edition (2017) Kagawa Nutrition University Publishing Division, Saitama (in Japanese)
15) Makino, N.: Carbohydrate at a glance (food and cooking data) (2016) Kagawa Nutrition University Publishing Division, Saitama (in Japanese)
16) Makino, N.: Tips for salt reduction at a glance (food and cooking data) (2015) Kagawa Nutrition University Publishing Division, Saitama (in Japanese)
17) Makino, N.: Salt at a glance (food and cooking data) (2013) Kagawa Nutrition University Publishing Division, Saitama (in Japanese)
18) Matsumoto, N.: Basic data for cooking (fifth revised version) (2018) Kagawa Nutrition University Publishing Division, Saitama (in Japanese)
19) Kagawa, A.: Encyclopedia of nutrition and calories of foods, Revised edition (2017) Kagawa Nutrition University Publishing Division, Saitama (in Japanese)
20) Kagawa, A.: Calorie guide for restaurants, convenience stores, and prepared foods, Revised edition (2017) Kagawa Nutrition University Publishing Division, Saitama (in Japanese)

21) Kagawa, Y.: Calorie guide to daily meals, Revised edition (2012) Kagawa Nutrition University Publishing Division, Saitama (in Japanese)

22) Kagawa, Y.: Home side dish calorie guide, Revised edition (2011) Kagawa Nutrition University Publishing Division, Saitama (in Japanese)

23) Kamimura, Y.: See with your eyes! Daily meals calorie encyclopedia (2014) Gakken, Tokyo (in Japanese)

24) Kamimura, Y.: Simplest and most beautiful! Revised edition calorie encyclopedia (2016) Shinsei Publishing Co. Ltd., Tokyo (in Japanese)

25) Koyama, Y.: Serving size nutrients 100 (2011) Dai-ichi Shuppan Co. Ltd., Tokyo (in Japanese)

26) Koyama, Y.: Serving size nutrients 100, Second revised edition (2017) DAI-ICHI SHUPPAN Co. Ltd., Tokyo (in Japanese)

27) Shufunotomo Co. Ltd.: Quick guide to food and food ingredients encyclopedia (2016) SHUFUNOTOMO Co. Ltd., Tokyo (in Japanese)

28) SHUFUNOTOMO Co., Ltd.: Latest quick index ingredients & cooking calorie book (2017) SHUFUNOTOMO Co., Ltd., Tokyo (in Japanese)

29) SHUFUNOTOMO Co., Ltd.: Quick index calorie handbook (2014) SHUFUNOTOMO Co., Ltd., Tokyo (in Japanese)

30) SHUFUNOTOMO Co., Ltd.: Quick index calorie handbook for eating out (2016) SHUFUNOTOMO Co., Ltd., Tokyo (in Japanese)

31) Science and Technology Agency: Standard Tables of Food Composition in Japan, fifth revised edition (2000) Ministry of Education, Culture, Sports, Science and Technology, Tokyo (in Japanese)

32) Yoshiike, N., Tajima, S., Takimoto, H.: Role of the National Nutrition Survey in health and welfare statistics and future issues: focusing on the revision of the nutrition intake survey in 2001, Journal of Health and Welfare Statistics, 49, 1–7 (2002) (in Japanese)

33) Kimura, Y., Teramoto, A., Jibu, Y., et al.: Comparison of Total Fish and Shellfish Consumption between Okayama Prefecture and Japan, J. Cookery. Sci. Jpn., 48, 200–206 (2015) (in Japanese)

34) Kim, J.E., Matsumoto, N.: The frequency usage of the food between Korea and Japan, J. Integr. Stud. Diet. Habits, 19, 363–368 (2009) (in Japanese)

35) Science and Technology Agency: Standard Tables of Food Composition in Japan, supplement 2018 (2015) Ministry of Education, Culture, Sports, Science and Technology, Tokyo (in Japanese)

36) Murakami, K., Livingstone, M.B.E., Sasaki, S.: Thirteen-Year Trends in Dietary Patterns among Japanese Adults in the National Health and Nutrition Survey 2003–2015: Continuous Westernization of the Japanese Diet. Nutrients., 10, e994, doi: 10.3390/nu10080994 (2018)

37) Ministry of Health, Labour and Welfare: The National Health and Nutrition Survey in Japan, 2015 (2017) Ministry of Health, Labour and Welfare, Tokyo (in Japanese)

38) Kato, I.: Stealth increases in Japan and Britain: The reality of shrinkflation, Diamond weekly, 105(23), 23 (2017) (in Japanese)

39) U.S. Department of Agriculture: Food and Nutrient Database for Dietary Studies (FNDDS), https://data.nal.usda.gov/dataset/food-and-nutrient-database-dietary-studies-fndds (Accessed April, 15, 2020)

40) Food Standards Australia & New Zealand: Food Standards Australia New Zealand, https://www.foodstandards.gov.au/Pages/default.aspx (Accessed April, 15, 2020)

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国民健康・栄養調査における栄養素および食品群摂取量推定を
目的とした食品の目安量改訂の変遷

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【目的】70年以上の歴史がある国民栄養調査（1945年から2002年）および国民健康・栄養調査（2003年以降）では、食事摂取量の正確な評価のために、食品の目安量がツールの1つとして提供されてい
る。そこで本稿では、国民健康・栄養調査で使用されている目安量が収載されている食品番号表の歴史、さらに最新の目安量の改訂についてまとめた。

【方法】国民栄養調査および国民健康・栄養調査に関する文献、法律、結果報告書およびウェブページを確認した。さらに、最新の目安量の決定に関する流れをまとめた。

【結果】食品成分表は国民健康・栄養調査における栄養素摂取量の算出に継続的に使用されていた。2000年の食品成分表の改訂に伴い、国民栄養調査で使用されている食品番号表も大きく改訂され、目安量を提示する食品数が増加していた。目安量は食品番号表が改訂されるたびに収載数が増え、2019年の改訂では、440食品の目安量が収載された。また、最新の改訂では、生鮮食品は個々に重量が異なることおよび市販食品は企業により規格が異なることなどの理由から、目安量は1点の数値でなく幅で示されることとなった。

【結論】全国的に実施する食事調査において、食事摂取量を正確に評価するためには食品の目安量は重要であり、定期的に改定していく必要がある。

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