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Adapting a standardised international 24 h dietary recall methodology (GloboDiet software) for research and dietary surveillance in Korea

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Abstract

During the past decades, a rapid nutritional transition has been observed along with economic growth in the Republic of Korea. Since this dramatic change in diet has been frequently associated with cancer and other non-communicable diseases, dietary monitoring is essential to understand the association. Benefiting from pre-existing standardised dietary methodologies, the present study aimed to evaluate the feasibility and describe the development of a Korean version of the international computerised 24 h dietary recall method (GloboDiet software) and its complementary tools, developed at the International Agency for Research on Cancer (IARC), WHO. Following established international Standard Operating Procedures and guidelines, about seventy common and country-specific databases on foods, recipes, dietary supplements, quantification methods and coefficients were customised and translated. The main results of the present study highlight the specific adaptations made to adapt the GloboDiet software for research and dietary surveillance in Korea. New (sub-) subgroups were added into the existing common food classification, and new descriptors were added to the facets to classify and describe specific Korean foods. Quantification methods were critically evaluated and adapted considering the foods and food packages available in the Korean market. Furthermore, a picture book of foods/dishes was prepared including new pictures and food portion sizes relevant to Korean diet. The development of the Korean version of GloboDiet demonstrated that it was possible to adapt the IARC-WHO international dietary tool to an Asian context without compromising its concept of standardisation and software structure. It, thus, confirms that this international dietary methodology, used so far only in Europe, is flexible and robust enough to be customised for other regions worldwide.

Key words: GloboDiet: EPIC-Soft (former name of GloboDiet): Computerised dietary assessment: 24 h Dietary recall: Standardisation: Surveillance: Korea

During the past decades, a worldwide rapid nutritional transition has been observed, in which large shifts occur in diet as well as in physical activity and lifestyle[1]. The global Westernisation of diet shares common characteristics across countries with an increased intake of animal source foods, added sugar, energy from fats and energy-dense foods[2–4]. This nutritional change has been hypothesised to be associated with an increased incidence of and mortality from major non-communicable chronic diseases[5]. The Republic of Korea (South Korea) is a country that has experienced one of the world's fastest socio-economic growth called 'the Miracle on the Han River' since the outbreak of the Korean War[6]. These rapid socio-economic and socio-cultural changes have remoulded the country's tradition and peoples' lifestyle affecting the unique aspects of the traditional diets in Korea[7]. Recently, a new type of dietary pattern has been identified in addition to Western and traditional diets[8]. The trend of nutrition transition is uneven between countries – probably reflecting different phases in this dynamic process and

Abbreviations: EPIC, European Prospective Investigation into Cancer and Nutrition; IARC, International Agency for Research on Cancer; KNHANES, Korean National Health and Nutrition Examination Survey; NCC, National Cancer Center of Korea; NCD, non-communicable diseases.

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country-specific diets and environment. For example, the proportion of fat-derived energy in Korea is low compared with its neighbouring countries (China and Japan) even though the total intake of fat is gradually increasing in Korea compared with other Asian countries[6,7,9]. When it comes to obesity patterns, Malaysia and Japan tend to have a higher prevalence of obesity while, in comparison, China and The Philippines have a relatively lower prevalence of obesity[6]. This country-specific nutritional transition and its association with cancer and other non-communicable diseases (NCD) need to be better understood to reverse and prevent the dramatically increasing trends on diet-related NCD burden projected in countries undergoing nutritional transition worldwide.

Applying a standardised methodology will improve the quality and comparability of data on dietary exposure assessment as diet is one of the main factors affecting the current NCD burden across countries. Indeed, the problem faced in tracing the changes in diet is that there are only few studies on diet and nutrition transition using comparable and individual data across countries due to the lack or heterogeneity of the dietary assessment methodologies[10]. This limitation has been found to reduce the possibilities to harmonise observations, recommendations and concerted actions of relevance for dietary research, nutritional surveillance and public health, at the international level[11].

The GloboDiet software (previously named EPIC-Soft), a computerised interview-based 24 h dietary recall program developed at the International Agency for Research on Cancer (IARC), is a highly standardised methodology successfully developed, validated and implemented as a reference dietary methodology in different international epidemiological and surveillance settings[12–17]. This method was initially used as a reference calibration method between twenty-three centres in the ten countries participating in the European Prospective Investigation into Cancer and Nutrition (EPIC) study, coordinated by the IARC. In the EPIC calibration study, a single 24 h recall was collected by direct or by telephone interview from almost 37 000 participants using an earlier version of GloboDiet[18]. More recently, this international software has been adapted, validated and implemented in countries that participated in the pan-European surveillance system[19].

Benefiting from these successful experiences in Europe, application of the GloboDiet methodology to other geographical regions could contribute to provide more comparable dietary exposure data worldwide, particularly within the framework of the WHO action plans to fight against and prevent the current diet-related NCD burden worldwide. The main objective of the present study was thus to develop a Korean version of the GloboDiet software and its complementary tools, as a first attempt to expand this IARC-WHO international computerised 24 h dietary recall program to an Asian context.

Experimental methods

The concepts of the standardised 24 h dietary recall computerised software (GloboDiet)

The interactive 24 h recall interview software was designed following pre-defined and standardised procedures described in detail elsewhere[20]. The 24 h recall interview using this software has five main steps: (1) general non-dietary information; (2) quick list; (3) description and quantification of foods and recipes; (4) quality controls; (5) description and quantification of dietary supplements. The structure of the software and detailed information of interview steps have been described in detail elsewhere[19].

Overall structure of databases

About seventy databases on foods, recipes and dietary supplements were customised and translated into Korean at the IARC. Common databases are the backbone of the standardisation within and between countries, for instance food and recipe classifications, facets/descriptors to describe foods in a comparable way, quantification methods and probing questions. 'Facets' are series of systematic questions to code different characteristics of the food (e.g. cooking method and preservation method) while 'descriptors' are pre-defined potential answers associated with each facet (e.g. boiled, fried and steamed for the 'cooking method' facet). More detailed explanations about the concepts and definitions of 'facets/descriptors' have been published elsewhere[18,20]. In contrast, country-specific databases are meant to capture the differences in diet existing within and between countries, for instance, food and recipe lists; brand name lists; facets and probing, which are specific to foods and recipes; quantification methods for each food item and recipe; coefficients for edible portion; cooking; density; fat left on the dish; default ratios for fat, sauce and sweeteners added to foods and recipes; and databases for quality controls[21]. All databases were prepared and customised using the data available in Korea[22–29].

Preparation of common databases

Food and recipe classifications were adapted according to foods consumed in Korea based on the IARC database library, which contains the common reference databases used in all GloboDiet versions. Facets/descriptors and probing questions were also selected from the IARC database library and several descriptors were added. For dietary supplements, facets and descriptors were also selected from the database library. All the common files were translated into Korean at the IARC.

Preparation of country-specific databases

Based on the nutrient database and recipes available from the Korean Nutrition Society[26], food and recipe lists were prepared considering their frequency of consumption at the National Cancer Center of Korea (NCC) with the guidance of IARC. Databases of the UK (demo) version were used as a model for database customisation process. Korean foods and recipes were classified according to adapted GloboDiet classification. For fish and vegetables, scientific names were added into their English names to ease their identification. Recipes from the Korean Nutrition Society were loaded into the Recipe Manager application, a specialised module of the

GloboDiet methodology to manage recipes, at both the NCC and the IARC. Food items and recipes can be quantified by means of photographs, volumes (directly or as household measures or as shapes and thickness), standard units (e.g. an apple, a can) or weight. Local standard units, shapes and household measures were gathered by the NCC in Korea. The information on the commercial products was collected by the NCC team by surveying at the major markets in Korea and searching on the Internet. Afterwards, the quantification methods such as household measures, photographs and standard units were assigned to each food item and dish, according to groups of foods/dishes (e.g. vegetables and dairy food) and states in which they are consumed, at the NCC and the IARC. During the interview, fractions and multiple of proposed quantity can also be applied to record the actual consumed portion. Coefficient databases including information on density, edible portion, weight change during cooking, absorbed fat weight during cooking, standard percentages of fat, sauce, sugar added to food/recipe and standard percentages of fat left in the dish were customised at the IARC using Korean values collected by the NCC and other values available from the other (European) versions, following the Standard Operating Procedures and guidelines prepared by the IARC. Facets, quantification methods and probing questions were assigned to each food and recipe at the IARC. Nutrient values for energy, carbohydrate, protein, fat and alcohol were attributed to each food item at the NCC using the nutrient database from the Korean Nutrition Society[26] for a final quality control at the end of the interview. Maximum portion sizes for each food item and recipe were set as warning to detect extreme or implausible portion sizes at the IARC. The dietary supplement list that was developed by the Seoul National University of Korea[30] using the 4th Korean National Health and Nutrition Examination Survey (KNHANES) contains the most up-to-date dietary supplement data and was adopted as such. All dietary supplements that were consumed more than once by respondents were included in this list. Additionally, texts for the user interface of the software were translated into Korean at the IARC. General information for dietary survey such as places of consumption, date, special occasions and special types of diets were translated into Korean at the IARC as well. We used weight and height data from Korea Centres for Disease Control and Prevention[23] and Korean Agency for Technology and Standards[28,29] to adapt the anthropometric database that is used to check missed fields or out-of-range values during subject information data entry; subject information is used for ultimate quality controls on energy intake *v.* energy requirement calculated according to its sex, age, height and weight[21].

Picture book

The picture book[31], part of the GloboDiet methodology, contains photographs of foods/dishes, household measures and shapes to assist respondents in estimating portion sizes when using GloboDiet. Photographs of foods/dishes: an *ad hoc* picture book was made including new Korean foods/dishes that were selected at the IARC as described below. The IARC guidelines[32] were followed at the IARC to choose the portion sizes and by a professional food photographer in Korea to take the pictures at the NCC. For spreads on bread, such as jam and butter, pictures for spreads of the GloboDiet picture book were enclosed in the Korean picture book. In order to select foods/dishes to be included in the picture book, foods and dishes consumed in the fifth KNHANES data[25] were listed by descending order of consumption frequency until cumulated percentages of the consumption frequency reached 80 %. Foods and dishes that can be easily quantified with household measures or shapes were removed from the list, whereas several foods or dishes that were difficult to quantify without pictures were included in the list even though they were not selected in the previous analysis (e.g. somen, Chinese noodles, cellophane noodles and sausage). Portion sizes to get four to six portions per photograph series of each selected food item and dish (see Fig. 2 for photograph series 412) were determined by analysing the intake amounts of the fifth KNHANES data. For the selected foods and dishes, individual portions consumed in one meal were calculated and examined. In principle, 10th and 90th percentile of consumed portions were selected as minimum and maximum portion sizes of pictures, respectively. For several food items, the selected minimum portions were too small and the 25th percentiles of consumed portions were instead selected as minimum portions. On the contrary, if the selected portions corresponding to the 90th percentile were too small, consumed portions of the 95th percentile were selected as maximum portions. These exceptional selections were made to enable each portion to be distinguishable and visible in the picture. From four to six portions were determined with a linear increase of at least 25 %. Shapes: new shapes of foods and dishes were designed based on collected data of packaging sizes surveyed by the NCC at the major market places in Korea with the guidance of IARC[32]. Food items and dishes were purchased and sliced if needed. Their surface areas were drawn to be included in the picture book and measured to be used for the quantification. Household measures: pictures of tableware that is generally used at restaurants and home were taken at the NCC according to the IARC protocol[32] (see Fig. 3).

Results

This project provided the first Asian version of GloboDiet, with about seventy databases being customised and translated into Korean. Customisation process of databases is shown in Table 1. New (sub-) subgroups were created and added into the existing common classification in order to fit to Asian specific foods. For food classification, seaweeds were added into 'vegetables', and insects and jellied food were added into 'miscellaneous' food groups. For the recipe classification, 'based on eggs' was added into 'soups.' The aim of having (sub-) subgroups in classification is to ease the classification of foods/recipes and comparisons across countries. Indeed, in order to reflect the high consumption of seaweeds in Korea/Asia compared with Europe, seaweeds previously

Table 1. Customisation of databases for the Korean version

Types of databases in GloboDiet	Customisation process
Common databases	
Food and recipe classifications	Added new subgroups
	Food class: seaweeds into vegetables, insects, jellied food into miscellaneous
	Recipe class: based on eggs into soups
	Translated into Korean
Facets/descriptors for foods and recipes	Added new descriptors into food facets
	Source: eel, croaker, hair tail, sea bream, tuna, squid, shrimps and crab
	Flavoured/added component: seafood not specified, maize, pine pollen, rice, sweet potato, pumpkin, persimmon, guava, wild grape, Japanese apricot/Chinese plum, seaweed not specified
	Translated into Korean
	Recommended facets and descriptors for each class
Quantification methods	Recommended quantification methods for each class
	Translated into Korean
Probing questions	Translated into Korean
Classifications and facets/descriptors for dietary supplements	Selected facets/descriptors
	Translated into Korean
Country-specific databases	
Food and recipe lists, shadow list, brand name	Collected and adapted from Korean database[26]
Facets by food and recipe lists	Assigned to each food item and recipe
Quantification methods	Created the picture book for the Korean version
	Prepared seventy-four of new pictures for Korean foods
	Prepared new twenty-five household measures with Korean tableware
	Prepared new five shapes
	Considered breads, omelettes and pizza in the market
	Added new diameters and squares
	Added new range of thickness
	Gathered standard units and portions in the market of Korea by searching data
Coefficient databases: density, edible part portions, raw-to-cook, absorbed fat content during cooking, fat left on the dish, default ratios for fat, sauce and sweeteners added to foods and recipes	Used coefficients used in other versions according to food types and groups
	Collected and adapted from available database in Korea
Probing questions specific to foods and recipes	Assigned to each food item and recipe
Quality control databases: food composition table of major nutrients, maximum quantity of food/recipe items	Food composition table: prepared based on Korean database[26]
	Maximum quantity of food/recipe items: used maximum values suggested according to serving sizes and adjusted according to each food item and recipe in the list
Dietary supplement list	Prepared based on consumed dietary supplements in the KNHANES[24] data

KNHANES, Korean National Health and Nutrition Examination Survey.

classified under the 'leafy vegetables' subgroup were gathered into a new and specific sub-subgroup 'seaweeds' created under the 'leafy vegetables' subgroup. In the Korean food list, eighteen kinds of seaweeds were reported in contrast to the one to three (generic) items (seaweeds) that were indicated in most of the European food lists. For the description of Korean food items, eight descriptors of seafood such as eel, croaker and squid were added into the facet 'source'. In addition, twelve new flavours were added into the facet 'flavoured/added component' to describe specific Korean foods such as traditional Korean cookies and soya milk. For example, 'seaweed' and 'pine pollen' were added for traditional Korean cookies while 'pumpkin' and 'sweet potato' were added for soya milk. Asian fruit flavours such as 'Japanese apricot/Chinese plum', 'wild grape' and 'persimmon' were added for yogurt and drinks. These minor amendments of the common files did not affect the overall structure or general concept of standardisation across country-versions of the GloboDiet software. Country-specific databases were prepared starting from the available Korean databases[22,24–27] and borrowing European data when necessary. Korean food, recipe, dietary supplement, synonym and brand name lists were collected in Korea. Total numbers of foods, recipes and dietary supplements were 1305, 119 and 1157, respectively. Facets were assigned to each food item and recipe. Databases on quantification methods were adapted to Korean diet considering types of food and Korean food packages available in the market.

A Korean picture book was generated including seventy-four Korean foods/dishes, four pictures for spreads, twenty-five Korean household measures and five shapes. Only four pictures from the original 'GloboDiet picture book' were included. The content of the picture book is described in the Table 2. The pictures of foods and dishes comprise two categories: (1) general pictures for quantification of the amount of foods/dishes consumed by respondents and (2) help pictures for identification of the food form/parts linked to standard units.

Fig. 1 shows screen shots illustrating the description of a steamed potato by a series of facets and descriptors in the

Table 2. The list of pictures in the Korean picture book

Categories	Dish/food name	Categories	Dish/food name
General pictures*	Korean rice cake, formed into a long white cylinder	General pictures	Seasoned sweet potato stem
	Watermelon		Seasoned boiled bracken
	Cabbage kimchi		Seasoned balloon flower
	Young radish kimchi		Seasoned stir-fried white radish
	Small radish kimchi		Seasoned dried white radish
	Mustard leaves kimchi		White radish salad
	Korean-leek kimchi		Seasoned Korean-leek
	Spring onion kimchi		Seasoned blanched mungbean sprouts
	Cucumber kimchi		Seasoned blanched spinach
	Rolled omelette with vegetable		Seasoned blanched dried-radish leaf
	Stir-fried pork with vegetables		Spicy seasoned cucumber salad
	Pork cutlet		Braised burdock
	Grilled pork belly		Seasoned chwinamul in soyabean paste sauce
	Sweet and sour pork with sauce		Seasoned soyabean sprouts
	Sweet and sour pork without sauce		Seasoned spring onion
	Grilled beef sirloin		Steamed zucchini salad
	Braised beef in soya sauce		Fresh napa cabbage salad dressed with salty sauce
	Grilled marinated red meat		Cabbage salad in mayonnaise dressing
	Roasted duck		Stir-fried kimchi
	Fried rice		Soya sauce-marinated raw crab
	Somen, cooked/dried		Canned tuna
	Chinese noodles, cooked		Stir-fried mushroom
	Cellophane noodles, cooked/dried		Broccoli, cooked
	Spaghetti, cooked/dried		Ginger
	Noodles in Chinese soyabean sauce		Sausage
	Cellophane noodles with sautéed vegetables		Stir-fried fish cake with vegetables
	Stir-fried anchovy		Braised lotus root
	Stir-fried baby anchovy		Seasoned dried and shredded squid
	Stir-fried sea mustard stem		Braised black bean
	Steamed potato		Grilled ham
	Stir-fried potato		Peanut
	Braised potato		Spicy stir-fried Korean rice cake
	Grilled mackerel		Spaghetti in tomato sauce
	Braised mackerel with radish		Slices of cheese on bread
	Garlic		Cheese spread on bread
	Cucumber		Butter on bread
	Carrot		Jam on bread
	Onion	Help pictures†	Breaded and deep-fried chicken
	Seasoned steamed aubergine		Steamed sweet potato

* General pictures enable to quantify the amount of foods consumed by respondents.
† Help pictures help to identify the food size/part and are linked to standard units.

Korean version and UK version as a means of comparison. In each window automatically displayed on the screen, a series of prompts asks the characteristic (facet) of the consumed food such as cooking method, physical state/form as quantified and preservation method. These series of prompts are proposed predefined descriptors (facet-related answers) that were adapted to the Korean food and recipe groups.

An example of photographs to quantify cabbage kimchi is shown in Fig. 2. To ease the estimation of the portion size, a spoon and chopsticks are displayed along with the dishes – the serving plate in real size is also shown in the Korean picture book. The weights of portions for 412-1 to 4 are 15, 34, 53 and 72 g, respectively, which increase linearly and show a minimum difference of 25 % between each subsequent portion size.

Examples of household measures and shapes are shown in the Fig. 3. Dimensions of rice and soup bowls and disposable paper cups are included in the picture book to check the selection with the respondents during the interview. Shape of squared sandwich bread and shapes of pies for bread, pancake, pizza and cake are in real size in the picture book (see Fig. 3).

Discussion

The Korean version of GloboDiet is the first Asian version of the international interview-based 24 h dietary recall software that has been already tested for its feasibility, validated and implemented in different epidemiological and surveillance settings in Europe[13,33–37]. To develop the Korean version, the overall structure of databases did not require any change. This confirmed the highly flexible structure of GloboDiet and its major potential as reference methodology for international dietary settings. Indeed, knowing that other Korean neighbouring countries share similar (feature of) dietary patterns and habits, this successful first attempt to adapt GloboDiet outside Europe opens many perspectives to expand the use of this IARC-WHO international tool to other Asian countries, more specifically in the framework of the WHO action plans on diet-related NCD.

In the customisation process, several challenges emerged due to lack of local data and difference in cultural background, compared with Europe. First of all, there was a lack of available databases for local coefficients such as

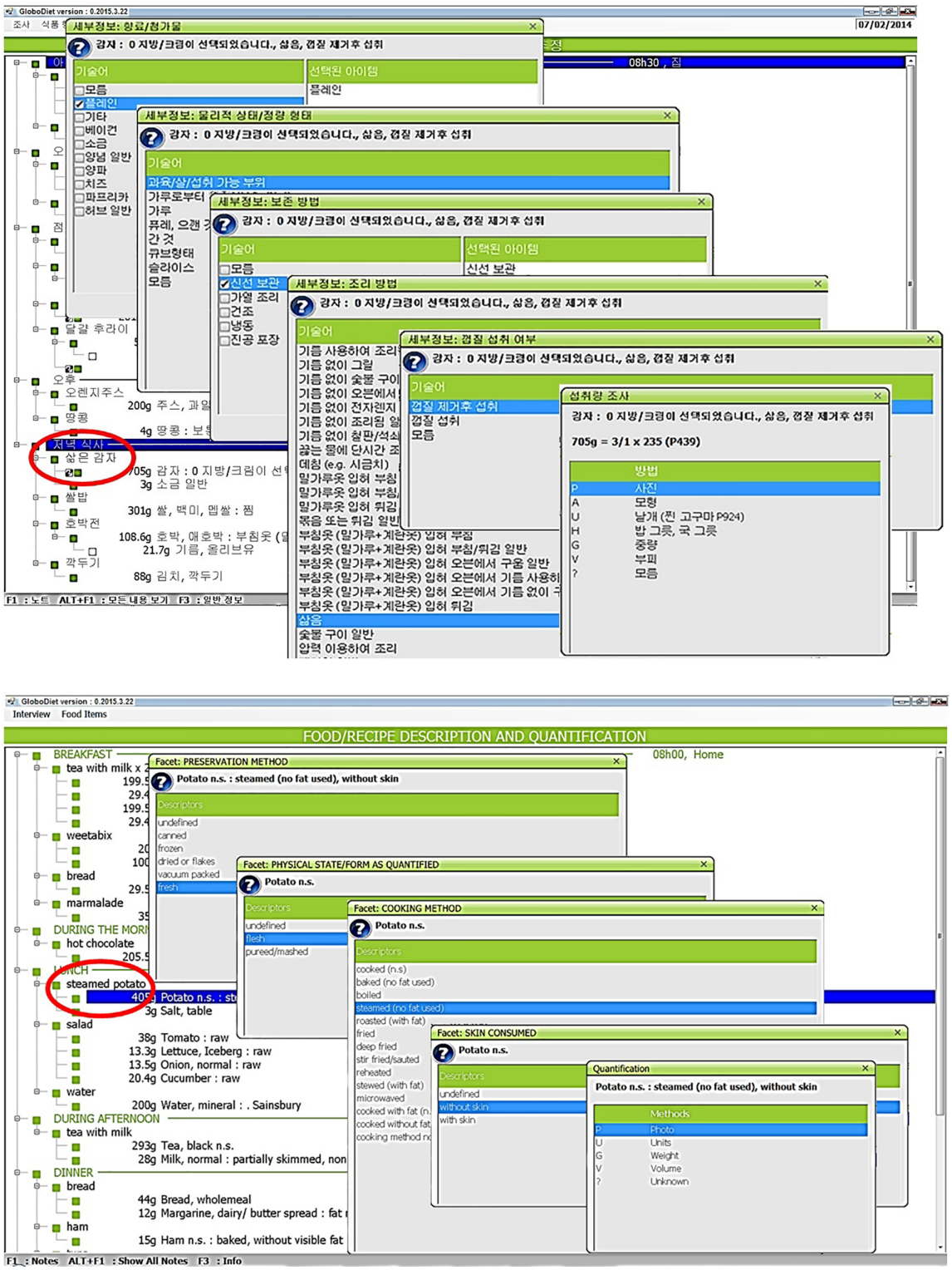

Fig. 1. Description of food by a series of facets and descriptors in the Korean and UK versions of GloboDiet: an example of steamed potato (the circled item). A colour version of this figure can be found online at http://www.journals.cambridge.org/bjn

density factors, raw-to-cooked and edible part coefficients that are required to get more accurate estimates of individual dietary intakes (as consumed quantities). For food items without locally available specific coefficients, European coefficients from the German and French versions of GloboDiet were copied, in particular, for coefficients such as density, standard percentages of fat/sauce left in the dish because those coefficients are not so different between Europe and Korea. Second, while most of the GloboDiet versions developed so far used Latin, Greek or Cyrillic alphabets, Korean (Asian) characters

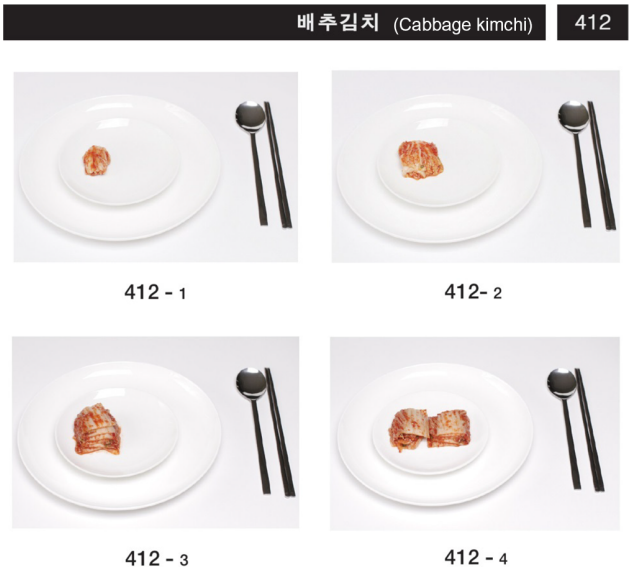

Fig. 2. An example of photographs for food portion quantification, cabbage kimchi. A colour version of this figure can be found online at http://www.journals.cambridge.org/bjn

were used for the first time in this version. To fit to the Korean language, orders of displayed words and sizes of windows were modified. Due to cultural differences, the way of displaying date and name was also modified. Third, photographs of Korean foods and tableware had to be taken for the picture book as most of the pictures used so far in Europe were not suitable. Although existing pictures are shared across European countries, only four of them (i.e. those available for spread on bread) were retained in the Korean version of the picture book. The new pictures represented frequently consumed Korean foods selected by systematic analysis of 24 h recall data of 15 723 participants from the fifth KNHANES. The number of picture series was determined based on previous experiences from implementations of GloboDiet in other countries.

A validation study is planned to be conducted in the near future aiming to evaluate the reliability of the data collected with the Korean version of GloboDiet against independent and recovery biomarkers such as double-labelled water and urinary N, K and Na. In Europe, GloboDiet has been successfully validated with urinary recovery biomarkers[12,14]. Two non-consecutive 24 h recalls using the GloboDiet with a food propensity questionnaire, which captures long-term frequency of non-quantitative intakes of infrequently consumed foods, have shown appropriate validity to rank subject according to their fish and fruit/vegetable intakes[13]. The association between reporting errors on 24 h recall and BMI was also examined[38]. Before the validation study, a pilot study has also been planned considering a convenient sample, in order to check the completeness of the GloboDiet

Fig. 3. Examples of household measures and shapes. A colour version of this figure can be found online at http://www.journals.cambridge.org/bjn

databases (e.g. missing foods and recipes). Currently, a nutrient database – supplementary to the Korean version of GloboDiet – for the calculation of nutrient intakes from the data collected using the Korean version of GloboDiet is under preparation for use in this validation study as well as future planned research and surveillance projects that are still under discussion. Once these planned studies are completed, actual implementation of the methodology in different research and surveillance settings in Korea can be foreseen. For example, the GloboDiet can be implemented in epidemiological studies such as cohort studies as well as nutritional monitoring surveys. To use the GloboDiet for children, foods that are frequently consumed among children will be added to the food list, and the picture book will be updated with household measures for children and pictures of added children's foods.

In Korea, two dietary assessment programs are available: CAN-Pro that was developed by the Korean Nutrition Society[27] and Dietary Evaluation System that was developed by the Human Nutrition Laboratory of Seoul National University[39]. Both of them were developed to be used for entry of open-ended survey results such as food records or 24 h recall while Dietary Evaluation System was especially designed for online 24 h recall interview. Compared with these programs, nutrient intake of subjects should be calculated with interview data collected with the GloboDiet and nutrient database outside of the software. Since collected interview data can be linked to any kinds of database, which is one of the strengths of the GloboDiet, the data can be used for studies of intakes at food level, meal patterns, risk assessment for food safety, dietary guidelines and so on. In addition, a data entry version of the GloboDiet can be used to enter dietary record data collected from children's parents. To assess children's diet, the international recommendations suggest different approaches than those applied for adults: food diaries or food records[40]. The GloboDiet 'data entry' module has already been successfully tested to complement the food records used in children for pan-European food consumption survey among infants, toddlers and children[17,41].

Conclusion

In conclusion, the Korean version of GloboDiet, as the first Asian one, is available for future research including validation study and dietary surveillance in Korea embedded within more IARC-WHO international initiatives. This has been achieved with marginal changes in the standardisation of the databases (e.g. additional specific food classification groups) and with no change in the software structure. This confirms that this IARC-WHO international dietary methodology, successfully used in different pan-European epidemiological and surveillance settings, is flexible and robust enough to be customised for other regions worldwide. It is, therefore, anticipated that the implementation of a common dietary methodology to increase data comparability across Asian and other countries, where the rapid nutritional transition is observed, is possible and could be achieved relatively rapidly according to the current IARC-WHO agendas.

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The authors' contributions are as follows: N. S. and G. N. led the development of the GloboDiet methodology at the IARC; M. K. P. coordinated the project and wrote the article under the supervision of N. S. and G. N. together with the GloboDiet team at the IARC; J. Y. P., G. N., J. K. and N. S. conceived and designed the study; local databases in Korea were collected by staff at the NCC and the IARC under the guidance of the IARC; J. K. supervised all the activities at the NCC; H. Y. P. contributed to data collection and database customisation; M. K. P. and G. N. mainly conducted the adaptation of databases at the IARC; N. S. had primary responsibility for the final content and supervised the study. Working procedures for the development of the GloboDiet versions were developed at the IARC. All authors critically reviewed the article.

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