Harmonisation of food groups across dietary studies to assess adherence to the Mediterranean diet in a uniform way

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Abstract:

There is currently no harmonised way of matching food consumption derived from UK food composition tables to food groups needed to answer a specific dietary study's research question. We have previously obtained BRU funding to harmonise food codes of three established studies to the NDNS food codes, create a universal food item database and develop codes to organise universal food items into food groups based on an index assessing adherence to the Mediterranean diet (PREDIMED score). The majority of this earlier work's deliverables have been met, however several issues (outlined below) were encountered that needed resolution to ensure that deliverables are meaningful and will result in accurate outputs. Completion of this work will aid us merge and compare dietary datasets in the future and allow a uniform way of assessing intake of food groups in dietary studies. Resolving these issues will ensure the work will be adaptable for other projects using different food composition databases and food grouping systems.

Background:

Adherence to the Mediterranean diet, for use in epidemiological or intervention studies in the UK (in patients with T2D or other non-communicable diseases), can be assessed by a previously validated index, the PREDIMED score (14 food items/habits) (Schroder et al, 2011). The consumption of food groups included in this index is estimated via common dietary assessment methods, such as food records or 24-hour recalls. These records are coded, using food composition data from national databases; in the UK, these are commonly the National Diet and Nutrition Survey (NDNS), the UK composition of foods integrated dataset (ID2) and directly from manufacturers' data.

For analysis purposes, foods are assigned to groups (e.g. fruit and vegetables). Different food composition tables have different pre-assigned food groups, and groups have been changed over time. In addition, there is currently no harmonised way of matching food consumption derived from UK food composition tables to food groups included in the aforementioned PREDIMED score. For example, olive oil intake and frequency of consumption cannot be directly estimated as a unique food group and habit, as the NDNS and ID2 food groups include olive oil with other dietary fats. Traditionally, research studies often create their own food groups to answer their specific research question. These groups are study-specific and are created manually by assigning individual food codes to a group. Different food composition databases use different coding systems, so it is frequently impossible to use syntaxes written for one dietary dataset on a different one, making it very time-consuming to allocate food items and compare food-group based analysis across different dietary datasets, or to merge dietary data.

Currently we have three full dietary datasets from very similar populations (STAMP-2; baseline and 6-month data from Early ACTID and; the Bristol PREDIMED study). These studies primarily used food composition data from NDNS, ID2 and the ALSPAC composition tables.

Aims & Objectives:

Following the successful resolution of the aforementioned issues, we are requesting an extension to our earlier grant in order to finalise our deliverables and outputs. The proposed extended project therefore aims to:

1. Harmonise food codes from the Early ACTID study to the NDNS food codes and universal food code database (Manmita Rai);

2. Allocate food items consumed in STAMP-2 and Early ACTID to the PREDIMED food groups (Manmita Rai);

3. Finalise a working version of the universal food code database and pilot-test it with dietary data reported in the STAMP-2 and Early ACTID studies (Stu Toms and Manmita Rai) and;

4. Finalise the development of STATA codes to extract uniform Mediterranean diet food groups (based on the PREDIMED score) from dietary data (Chris Penfold, Manmita Rai) and pilot-test the use of these codes to extract Mediterranean diet food groups from the universal food code database (Chris Penfold, Stu Toms and Manmita Rai).

In the long term, the STATA codes developed will be adaptable for other dietary studies using different food groups and dietary indices (e.g. Healthy Eating Index, other Mediterranean diet scores etc.), which will be incorporated into the universal food code database.

Method:

We will utilise dietary datasets obtained from three studies: (i) the Bristol PREDIMED study; (ii) STAMP-2 and; (iii) Early ACTID.

Stage 1: The NDNS food codes will be used for the standard universal food code. Food items from the Early ACTID study will be matched to the NDNS food composition database list of food codes by Manmita Rai. Any unique food items will be added to the universal food code database and allocated a new universal food code (similar to what has already been achieved for Bristol PREDIMED and STAMP-2).

Stage 2: The universal food codes will be organised into uniform Mediterranean diet food groups (based on the PREDIMED score) for STAMP-2 and Early ACTID by Manmita Rai (similar to what has already been achieved for Bristol PREDIMED).

Stage 3: Finalise the universal database of food items drawn from multiple food composition databases, a first version of which has been created by Stu Toms. We are requesting extended BRU support from Stu Toms to finalise the data management system, whereby any dietary study coded using NDNS, ID2 or ALSPAC composition tables can be automatically harmonised to our universal database of food items and used to create food groups from a growing library of food group systems. In the immediate term, food groups have been created to reflect the PREDIMED food groups, and Stu Toms will work with Manmita Rai to pilot-test the data management system with data from the STAMP-2 and Early ACTID studies (by developing search criteria to best match unique

food items from each dietary study with food items in the universal food code database and allocating food items reported in the dietary studies' food records to Mediterranean diet food groups). In the longer term, we anticipate creating food groups that allow analysis based on other dietary indices and could extend this to include categorisation by meal/snack/drink frequencies.

We have already consulted with Stu Toms, who is in support of our request and has estimated that the working version and pilot-testing of this system would be finalised within the requested two months.

Stage 4: Finalise the development of statistical codes in STATA that will be used to extract uniform Mediterranean diet food groups (based on the PREDIMED score) from dietary data (Chris Penfold, Manmita Rai) and pilot-test the use of these codes to extract Mediterranean diet food groups from the database developed at stage 3 (Chris Penfold, Stu Toms, Manmita Rai).

We are requesting extended BRU statistical support to finalise these codes. We have already consulted with Chris Penfold, who is in support of our request.

Outcome measures:

Mediterranean diet adherence, cardiovascular risk factors, food group harmonisation.

In the short term, this extended work will contribute to at least two publications where the BRU will be acknowledged:

1. Adherence to the Mediterranean diet and associations with cardiovascular risk factors among patients with newly-diagnosed diabetes (STAMP-2 data)

2. Adherence to the Mediterranean diet in patients with newly-diagnosed diabetes participating in a lifestyle intervention: data from the Early ACTID study (Early ACTID data)

In the longer term, this will create a user-friendly system to merge and compare dietary datasets. This will be of particular importance if we want to generate more complete dietary datasets from the partially entered ACTID Plus food diaries.