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SHORT COMMUNICATION

Assigning glycemic index to foods in a recent Australian food composition database

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This paper describes the compilation of a special edition of the AUSNUT2011–2013 food composition database that includes glycemic index (GI) values. A 6-step, systematic methodology was used to assign GI to 5644 foods included in AUSNUT2011–2013. A total of 1752 (31%) foods were assigned a GI of 0 owing to low carbohydrate content; 363 (6%) had a direct match in 1 of the 4 data tables used; 1738 (31%) were assigned the GI of a 'closely related' food item; 1526 (27%) were assigned the weighted mean GI of ingredients; 205 (4%) were assigned the median GI of their corresponding food subgroup; 49 ($<1\%$) were assigned a GI of 0 because they were not a significant source of carbohydrate in typical diets; and 5 ($<1\%$) were assigned a default GI. We propose that this database should be used for all future Australian GI research until a subsequent version/update is compiled.

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INTRODUCTION

The glycemic index (GI) of foods is a measure of dietary carbohydrate quality. Carbohydrate foods with a low GI are digested, absorbed and/or metabolised slowly, therefore on a gram-for-gram basis, they have a lower impact on postprandial glycaemia compared with carbohydrate foods with a high GI.[1] A rapidly growing body of evidence indicates that a low GI eating pattern is protective of chronic disease risk,[2] and may assist with weight[3] and diabetes management.[4]

Unlike macro and micronutrients, GI values of foods are not routinely included in food composition databases. Our group have previously collated and published the International Table of Glycemic Index and Glycemic Load for use by researchers.[5] Nonetheless, appropriate linkage of values in the International Table to food items requires expertise in the GI concept. This is a major obstacle hindering the use of the GI concept outside of the research setting.

Given the strong evidence showing the health benefits of a low GI eating pattern, we believe it would be of great interest to healthcare professionals if they can assess the GI of their clients' diet. We therefore aimed to compile a special edition of AUSNUT2011–2013[6] with GI values assigned to all included foods, which could be used both in the research and clinical settings.

MATERIALS AND METHODS

On the basis of a method previously described by us,[7] we assigned GI values to 5644 of 5740 foods included in AUSNUT2011–2013. Foods only used in the National Aboriginal and Torres Strait Islander Nutrition Survey ($n = 96$) were excluded from this process. The six sequential steps used in this method were:

Step 1: assign GI of 0 to foods with $\leqslant 2.5$ g carbohydrates per 100 g.

Step 2: determine if there is an exact match in the three databases used. If yes, assign that GI value. If no;

Step 3: determine if there is a 'closely related food item' in the four databases used. If yes, assign that value. If no;

Step 4: Determine if the food is a recipe-based 'mixed food' that can be disassembled. If yes, calculate the weighted GI of the recipe. If no;

Step 5: Determine if the median GI of the food subgroup is available. If yes, assign the median of the subgroup. If no;

Step 6: determine if the food is likely to be a significant contributor to carbohydrate intake. If yes, assign default GI (vegetables = 40; flour products = 70; and dairy foods = 30).[5] If no, assign a GI of 0.

The GI values were sourced from one of the following data tables: (1) The International Table of Glycemic Index and Glycemic Load Values,[5] which serves as the primary data source; (2) the Sydney University Glycemic Index Research Service online database,[8] which contains values tested after the publication of #1; (3) a study of Chinese foods by Chen *et al*.[9] published after the publication of #1; and (4) Professor Jennie Brand-Miller's Shopper's Guide 2015.[10] If the GI values from the source databases were on the white bread scale, they were converted to the glucose scale by the formula: $GI_{glucose\ scale} = GI_{white\ bread\ scale} \times 0.7$. Whenever possible, only Australian GI values were used to ensure better representation of the characteristics of Australian foods. Values from subjects with diabetes (GI_{diab}) were only used when no values from healthy subjects ($GI_{healthy}$) were available, and the values were converted to $GI_{healthy}$ using the equation: $GI_{healthy} = (GI_{diab} - 9.7)/0.9$.[5] The final GI values were independently reviewed by a dietitian experienced in GI testing (AWB) to ensure accuracy and appropriateness.

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RESULTS

Following the method, 1752 (31%) foods had < 2.5 g of available carbohydrates per 100 g and were assigned a GI of 0 (Step 1). There were 363 (6%) foods that had a direct match in one of the three data tables used (Step 2), and 1738 (31%) were assigned the GI value of a 'closely related' food item (Step 3). GI values of 1526 (27%) foods were calculated using the weighted average GI method (Step 4). There were 205 (4%) foods that were assigned the median GI of their corresponding food subgroup (Step 5), while 49 (< 1%) foods were assigned a GI of 0 because they were deemed not to be a significant source of carbohydrate in portions normally consumed in Australian diets, and 5 (< 1%) foods were assigned a default GI (Step 6).[7]

DISCUSSION

We believe this special edition of AUSNUT2011–2013 will be a useful resource for Australian researchers and healthcare professionals interested in the GI concept. We propose that this database should be used for all future Australian GI research until a subsequent version/update is compiled.

CONFLICT OF INTEREST

JCBM, and AWB are co-authors of The New Glucose Revolution and Low GI Diet books (Hachette Livre Australia and Da Capo Press, North America). JCBM is a director of a not-for-profit GI-based food endorsement program in Australia, and manages the University of Sydney GI testing service. AWB is the Chief Scientific Officer of a not-for-profit GI-based food endorsement program in Australia. JCYL received consultation fee from the Glycemic Index Foundation, a not-for-profit health promotion charity, for the sole purpose of producing the database outlined in this report.

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We thank Food Standards Australia and New Zealand for granting permission to reproduce the 'food ID' and 'food name' of the foods in AUSNUT2011–2013. The authors declare that: (1) they are responsible for the accuracy and the reliability of the glycemic index data presented in the database; and (2) the glycemic index database is not produced by, or is in anyway associated with or endorsed by Food Standards Australia and New Zealand. A license is required from the Glycemic Index Foundation to access this special edition of AUSNUT2011–2013. Interested parties should contact AWB (alan.barclay@gisymbol.com). Research purposes will attract a nominal rate to cover admin costs. Funding source: The Glycemic Index Foundation.

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