

Development of a Food Frequency Questionnaire for adults in a population-based sample in Cuiabá, Mid-Western Region of Brazil

Abstract

Objective: To describe the design of a Food Frequency Questionnaire (FFQ) to be used in studies on food intake of adults from Cuiabá, Mato Grosso State, Brazil. **Methods:** A 24-hour dietary recall (24hR) was applied to a sub-sample of 104 men and women, randomly selected from a random population-based study sample. Based on the frequency of report and on the contribution to the intake of energy and nutrients in the 24hR, 81 food items and respective reference servings were selected to comprise the FFQ food list. Reference portions were defined based on the most reported portion sizes in the 24-hour dietary recalls. The FFQ list was associated to eight options of intake frequency. **Results:** Sugar, coffee, beans, rice, beef, bread, and soda were cited by at least 50% of the interviewed group and the latter four foods were the ones that most contributed to energy intake. There were no differences among men and women related to the foods that provided most macro and micronutrients. **Conclusion:** The FFQ included the most relevant food items involved in the food habits of the adult population from Cuiabá, Mato Grosso. Once the validity and reproducibility of this tool are proven, it will be useful in epidemiologic and clinical investigations on the role of diet on disease development in the target population.

Keywords: Questionnaires. Food intake. Adult.

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Introduction

In the light of the current epidemiological scenario in Brazil, food intake is a challenging but highly relevant area of research to elucidate relationships between diet and disease. The development of specific instruments for dietary assessment in different Brazilian regions associated with other indicators of nutritional status can help monitoring dietary trends and shaping public health policies.

The Food Frequency Questionnaire (FFQ) is a method widely applied in the assessment of food intake in epidemiological studies. This instrument consists of a list of food items that are most commonly consumed or included in the food habits of a given population. The FFQ is used to record the usual intake frequency of listed foods in a pre-established period as well as specifications of average portions consumed.^{1,2}

The FFQ is an easy-to-use, low-cost objective instrument that can be adapted to the target population, thus justifying its use in population-based studies. It is believed to be the most practical and useful method for the assessment of food intake.^{1,3,4}

However, the FFQ has limitations as it relies on respondents' recall of past habits, provides less accurate quantification of food intake by using standardized measures, and does not allow detailed food intake due to a pre-established food listing.^{1,4} In addition, factors such as age, education, and ethnic origin may affect the validity of data collected in the FFQ.⁵

These limitations can be minimized through the development of group-specific questionnaires, which are less prone to misinterpretation and can provide more accurate, valid information.^{6,7}

Given the importance and need of appropriate food intake assessment, the purpose of the present study was to develop an FFQ based on a probability sample for use in studies on food intake in adults in the city of Cuiabá, Central-West Brazil. This study represents a major advance in

nutritional epidemiology as it is unprecedented the development of a FFQ in this region.

Methods

Study population

The development of the FFQ was based on prior administration of 24-hour dietary recalls (24hRs) on 104 adults living in the urban area of Cuiabá, a subsample randomly selected from a probability sample in a population-based study.⁸ According to Willett,¹ a sample of 100 respondents is considered sufficient to develop instruments to provide acceptable results in FFQ validity studies.

Twenty-four-hour dietary recalls were administered to randomly selected residents of two lower-middle and upper-middle income districts. These districts were selected from two lists of districts classified according to household head income by the Institute of Urban Planning and Development of the City of Cuiabá.⁹ Districts with predominantly low-income populations were excluded as they could lack the money to buy food and could not afford a variety of food, thus affecting the selection of food items in the FFQ.

Streets of the selected districts were mapped and households were drawn. Only one individual per household aged between 20 and 50 years was selected to avoid information interdependence among respondents. Bedridden and disabled individuals, pregnant and breastfeeding women, patients with diseases requiring dietary changes were not eligible to participate in the study. All respondents selected agreed to participate with no refusals recorded.

Data collection

Data was collected through household interviews carried out in March 2007. Twenty-four-hour dietary recalls were used to collect information about food intake and a standard questionnaire was used to record self-referred socioeconomic and anthropo-

metric information. All interviews were performed by two trained 4th grade students of Nutrition at Universidade Federal de Mato Grosso (UFMT).

Weekdays and weekend days were evenly selected to the 24hDR application. Common household vessels, glassware, and silveware were used for the report of portion sizes – this was facilitated by the fact that all interviews were conducted in the households. Trademarks, product type, and packaging capacity of processed foods were recorded for more accurate assessment of portions consumed.

During the interviews, respondents were asked to report all food items and beverages consumed in the previous 24 hours, and their amounts and portion sizes in household measures. To improve accuracy of data collected the following measures were taken:

- a) Based on a pre-defined list of foods and dishes, available in the study manual, interviewers checked for missing items not usually reported in similar studies;¹
- b) All ingredients of dishes, as well as amounts consumed, were specified;
- c) Time and place where foods were consumed were recorded;
- e) All items were carefully reviewed to ensure that no food was missing.

Development of the FFQ

A list of 289 food items was constructed based on data from 24-hour dietary recalls. For the FFQ those items most commonly reported in the sample studied,¹⁰ at a frequency of 15% or more, either as a single item or part of any preparation, or even together with other foods of similar nutritional composition, were selected.

The FFQ list also included specific food items that, despite below the established frequency cutoff, can possibly help identify dietary patterns or trends, e.g., seasonal or processed food, and regional dishes.¹⁰ Also, some foods were grouped by their nutritional similarity.

We also estimated the energy contribution of each food item and 13 nutrients – carbohydrate, protein, total fat, saturated and unsaturated fat, cholesterol, fiber, iron, calcium, folate, thiamin, vitamin C and vitamin B6 – using Block et al. method,¹¹ which calculates the ratio between the amount of a nutrient in each food item and total nutrient in all food items, multiplied by 100. There were also prepared lists of foods that contributed with 90% of intake of energy and major nutrients in the diet of the sample studied.

Frequency options were defined based on those used in FFQs developed for use in adults¹² and adolescents¹³ in studies carried out in the city of Rio de Janeiro.

Reference portion sizes were defined based on the most common food portions reported in the 24-hour dietary recalls. Conventional portioning was used for some foods, for example, a French roll or an egg (one unit).

The nutritional composition of each food item was assessed based on the NutWin software,¹⁴ preparations not originally included in the program were estimated by composing food information of the components. The composition of food preparations/dishes that were added was based on detailed nutritional content records developed based on food items in the NutWin table. Missing information for any micronutrient was completed with nutritional data from the Brazilian Food Composition Table.¹⁵

Socioeconomic and nutritional status and energy contribution of macronutrients

Socioeconomic status (SES) of respondents was assessed according to the Brazilian Association of Market Research criteria:¹⁶ accumulation of material goods, purchasing power, and household head schooling. Families were divided into five socioeconomic classes, from A (highest) to E (lowest).

Nutritional status was assessed using body mass index (BMI = weight/height²)

cutoffs as recommended by the World Health Organization (WHO).¹⁷

Energy contribution of macronutrients was based on the Brazilian Ministry of Health recommendations.¹⁸

Ethical considerations

All respondents were informed about the study purposes and signed an informed consent form following Resolution 196/96 of the Brazilian National Health Board. The study was submitted to and approved by Research Ethics Committee of Julio Muller University Hospital (Protocol No. 234/CEP-HUJM/05). No invasive procedures were performed.

Results

The sample included 53 (51.0%) women; the mean age was 34 years old (standard deviation = 9 years old); 37.5% of the respondents were between 20–39 years old; 46.2% completed the high school education and 20.2% completed elementary school education or never attended school; 51.0% of respondents were class B (table 1).

There was a 40.4% prevalence of excess weight in this sample (BMI \geq 25 kg/m²), of which 30.8% were overweight and 9.6% obese. Normal weight (BMI \geq 18.5 and $<$ 25.0 kg/m²) was found in 54.8% and only 4.8% were underweight (BMI $<$ 18.5 kg/m²).

The food items reported at a frequency of at least 15% in the sample studied are listed in Table 2. Rice, meat, beans, soft drinks, sugar, coffee and bread were consumed by over 50% of the sample. The intake of foods rich in protein, especially beef (63.5%), beans (68.3%), chicken (34.6%), and milk (34.6%) was remarkable. Lettuce (45.2%) and tomato (44.2%) were the most common vegetables consumed.

Food items less commonly reported were: eggs (9.7%), cookies (9.7%), canned food (9.7%), chocolate powder (13.5%), bonbon (13.5%), yoghurt (10.6%), ice cream/popsicle (7.7%), alcoholic beverages (8.7%), candied fruits/caramelized milk

Table 1 – Socioeconomic and demographic characteristics of adults living in the urban area of Cuiabá, Brazil, 2007 (N = 104).

Variable	N	%
Age (years)		
20–39	39	37.5
30–39	32	30.8
\geq 40	33	31.7
Gender		
Male	51	49.0
Female	53	51.0
Schooling		
Did not attend school/ incomplete elementary school education	21	20.2
Elementary school education	9	8.7
High school education	48	46.2
College education	19	18.3
Graduate education	7	6.7
Socioeconomic classification*		
B	53	51.0
C	34	32.7
D	17	16.3

* Brazilian Association of Market Research criteria¹⁶

(13.5%), pizza/pasta (4.8%), and hamburger snacks (5.8).

The FFQ list comprised 81 food items organized by food groups with eight categories of frequency of consumption: more than 3 times a day; 2–3 times a day; once a day; 5–6 times a week, 2–4 times a week; once a week; 1–3 times a month; and never or almost never.

Tables 3 and 4 show major food sources of energy and nutrients in the entire sample and by gender. Food items that contributed most to the energy intake were meat (22.2%), rice (9.9%), bread (9.9%), pasta (5.1%), and soft drinks (5.0%); the same was seen in women and men, except for pasta. However, appetizers (5.7%) were a main source of energy consumption in men and cookies/ cakes (6.9%) in women.

Sweet/baked goods contributed most to carbohydrate intake among men. Total protein intake from milk and dairy products

Table 2 – Frequency of food items mostly consumed in the study population assessed by 24-hour dietary recalls. Cuiabá, Brazil, 2007.

Food items	n	%
Rice	87	83.7
Beef	66	63.5
Beans	71	68.3
Soft drinks	67	64.4
Crystal sugar	66	63.5
Infusion coffee	67	64.4
Bread	59	56.7
Lettuce	47	45.2
Tomato	46	44.2
Chicken	36	34.6
Whole milk	36	34.6
Appetizers (fried turnover, kibbeh, fried pastry, chicken croquette, sfha)	29	27.9
Margarine	23	22.1
Spaghetti	23	22.1
Cheese	21	20.2
Manioc	17	16.3
Cold cuts (ham, mortadella, smoked turkey breast)	17	16.3
Manioc flour, <i>farofa</i> [toasted cassava flour], or manioc mush	16	15.4

was only significant among women (5.0%). Appetizers (7.8%) and chocolate (4.7%) contributed significantly to total fat intake in men and women, respectively.

Beans were the main food source of fiber and folate in the entire sample and in both men and women. It is noteworthy that fruit juice is a major source of vitamin C (90.3%) in women, whereas fruit juice (28.5%), fruits (19.5%), and vegetables (16.6%) are important sources of vitamin C in men.

The FFQ developed offers up three choices of servings consumed for 63 food items. For all other items we considered only their dietary frequency as they were food condiments or foods and dishes with nutritional composition similar to other items in the list. Table 5 describes reference portions sizes (in grams and common household

measures) of the food items most commonly reported in the sample.

Diet was high in protein, which provided 19.0% of total energy intake. Fat intake was in the recommended limit (30.0%), and carbohydrate supplied 51.0%, of dietary energy intake.

Discussion

In the present study, the FFQ food list was elaborated from information obtained in 24-hour dietary recalls, given the lack of studies on the most consumed foods among adults in the city of Cuiabá. Previous studies have assessed dietary intake of specific population groups such as adolescents, pregnant women,¹⁹ and staff of a university hospital.²⁰

Meat, rice, and bread were the main sources of energy. Brazilian studies^{23,31} have reported similar findings in people living in other Brazilian regions. However, in the target population of this study, meat was a major source of energy, which was twice as much as that reported in a São Paulo study³¹ and more than five times higher than that seen in women living in the state of Paraíba.²³ It is also remarkable the fact that soft drinks are a moderately important source of energy intake in men and women studied.

Traditional Brazilian foods such as rice and beans remain in the diet of Cuiabá population, which can be seen as a positive finding, since trends have shown that these foods have declined in importance in Brazil.³² On the other hand, unhealthy eating habits were evidenced such as high intake of simple carbohydrates and soft drinks and low fruit and vegetable intake, which suggest risk behaviors and similar dietary patterns in the Brazilian population.³²

Unhealthy eating has a direct association with nutritional status and is a risk factor for several chronic non-communicable diseases as well. Data on nutritional status in this study showed a high prevalence of excess weight. The Brazilian Institute of Geography and Statistics (IBGE)³² National Household Survey (POF 2002–2003) pointed out that Cuiabá is the Brazilian capital with

Table 3 – Contribution to total energy and macronutrient intake among adults from Cuiabá, Brazil, 2007.

Variables	Contribution of food items (%)		
	Entire sample	Men	Women
Energy (kcal)	Meat (22.2)	Meat (22.7)	Meat (24.1)
	Rice (9.9)	Rice (9.6)	Rice (10.3)
	Bread (7.0)	Bread (6.2)	Cookie/cake (6.9)
	Pasta (5.1)	Appetizers (5.7)	Pasta (6.2)
	Soft drinks (5.0)	Soft drinks (5.1)	Soft drinks (5.0) Bread (5.0)
Carbohydrate (g)	Rice (16.0)	Rice (15.9)	Rice (16.2)
	Soft drinks (11.1)	Soft drinks (11.9)	Bread (10.5)
	Bread (9.0)	Bread (11.1)	Soft drinks (10.1)
	Sugar/sweets (7.5)	Sugar/sweets (7.4)	Cookie/cake (8.2)
	Fruit juice (6.7)	Fruit juice (5.8)	Fruit juice (7.9)
Protein (g)	Meat (53.5)	Meat (48.7)	Meat (61.3)
	Beans (3.9)	Beans (3.9)	Pasta (5.7)
	Bread (3.7)	Bread (3.9)	Dairy products (5.0)
	Dairy products (3.5)	Pasta (3.6)	Bread (4.3)
	Rice (3.2)	Appetizers (3.4)	Rice (4.0)
Fat (g)	Meat (38.6)	Meat (38.9)	Meat (44.9)
	Appetizers (6.6)	Appetizers (7.8)	Cookie/cake (7.6)
	Pasta (4.7)	Dairy products (3.6)	Pasta (6.7)
	Cookie/cake (4.6)	Tubercles (fried) (3.5)	Dairy products (5.9)
	Dairy products (4.2)	Pasta (3.3)	Chocolate (4.7)
Saturated fat (g)	Meat (48.7)	Meat (49.6)	Meat (55.9)
	Dairy products (4.4)	Pasta (3.8)	Ice cream (6.7)
	Butter/margarine (2.9)	Tubercles (fried) (3.6)	Butter/margarine (5.2)
	Cold cuts (2.8)	Cookie/cake (3.4)	Dairy products (5.0)
	Cookie/cake (2.8)	Cold cuts (2.6)	Chocolate (3.9)
Unsaturated fat (g)	Meat (46.0)	Meat (39.0)	Meat (55.9)
	Rice (4.0)	Rice (5.8)	Rice (5.3)
	Beans (3.8)	Tubercles (fried) (4.2)	Butter/margarine (5.1)
	French fries (2.9)	Beans (3.7)	Beans (3.9)
	Eggs (2.7)	Soybean oil (3.1)	Cold cuts (3.1)
Cholesterol (mg)	Meat (63.8)	Meat (58.2)	Meat (71.8)
	Eggs (7.8)	Eggs (8.1)	Eggs (7.4)
	Pasta (2.9)	Pasta (2.4)	Ice cream (3.4)
	Dairy products (2.41)	Cold cuts (1.7)	Dairy products (3.2)
	Cold cuts (2.1)	Appetizers (1.4)	Cold cuts (2.8)
Fiber (g)	Beans (33.2)	Beans (34.8)	Beans (31.1)
	Bread (13.4)	Bread (12.7)	Fruits (14.1)
	Fruits (11.1)	Vegetables (11.5)	Bread (11.9)
	Vegetables (10.6)	Fruits (7.9)	Vegetables (11.8)
	Pasta (4.1)	Tubercles (6.6)	Pasta (6.9)

the highest prevalence of overweight among men (54.8%), higher than the average prevalence in Brazilian male population (41.1%). According to data from the Telephone-based **Surveillance** System of Risk and Protective

Factors for Chronic Non-**Communicable Diseases** (VIGITEL),³³ Cuiabá ranks third among Brazilian capitals with the highest overweight prevalence in men (51.4%) and sixth in women (38.5%).

Table 4 – Contribution to micronutrient intake among adults from Cuiabá, Brazil, 2007.

Variables	Contribution of food items (%)		
	Entire sample	Men	Women
Calcium (mg)	Dairy products (19.9)	Dairy products (15.5)	Dairy products (25.8)
	Meat (11.5)	Meat (12.7)	Meat (8.8)
	Bread (10.3)	Bread (11.7)	Bread (7.4)
	Pasta (8.8)	Pasta (10.5)	Pasta (6.7)
	Appetizers (7.2)	Appetizers (9.5)	Ice cream (5.8)
Iron (mg)	Meat (36.7)	Meat (43.7)	Meat (34.6)
	Bread (8.1)	Bread (9.8)	Cookie/cake (13.3)
	Beans (6.9)	Beans (8.3)	Bread (7.5)
	Pasta (5.2)	Pasta (5.9)	Vegetables (7.4)
	Vegetables (4.1)	Appetizers (4.5)	Beans (6.3)
Vitamin C (mg)	Fruit juice (83.6)	Fruit juice (28.25)	Fruit juice (90.3)
	Fruits (3.5)	Tubercles (17.2)	
	Tubercles (2.9)	Fruits (19.5)	
	Vegetables (1.8)	Vegetables (16.6)	
		Pasta (2.8)	
Thiamine (mg)	Meat (28.1)	Meat (29.5)	Meat (29.9)
	Bread (13.3)	Bread (15.0)	Bread (11.2)
	Beans (12.9)	Beans (14.8)	Beans (10.5)
	Pasta (9.0)	Pasta (8.3)	Pasta (9.1)
	Rice (5.4)	Appetizers (5.2)	Tea (8.5)
Folate (mcg)	Beans (37.4)	Beans (37.5)	Beans (38.0)
	Pasta (7.9)	Pasta (8.3)	Vegetables (11.5)
	Meat (6.4)	Vegetables (7.2)	Pasta (7.4)
	Bread (6.1)	Fruit juice (6.7)	Meat (6.4)
	Fruit juice (5.8)	Meat (6.9)	Bread (5.6)
Vitamin B6 (mg)	Vegetables (42.9)	Vegetables (35.1)	Vegetables (49.2)
	Appetizers (6.0)	Appetizers (9.3)	Chocolate (7.4)
	Chocolates (6.0)	Meat (9.2)	Cookie/cake (5.9)
	Pasta (5.7)	Pasta (8.5)	Butter/margarine (5.4)
	Meat (5.5)	Fruit juice (5.9)	Meat (4.8)

The Brazilian Ministry of Health recommends a diet where 55%–75% of total energy should be provided by carbohydrate, 10% and 15% from protein and between 15% and 30% from fat.¹⁸ The percent contribution of proteins to total energy in adults in Cuiabá was found slightly higher than recommended. It can be mainly attributed to high consumption of beef, which was the second most consumed food identified in this study. However, there was found an adequate fat intake, although some Brazilian studies have shown excessive fat consumption, especially saturated fat.^{32,34}

The strategies used in this study to construct the food list of the FFQ are considered

the most suitable as they allow to obtaining a list that is not limited, enabling the development of an instrument with greater ability to assess actual food intake.²⁷ The advantages of 24-hour dietary recalls include its short administration, low cost, high acceptance and being easily understandable by respondents.^{10,28,29} A comparison between the list obtained from food frequency reports and that obtained from the percentage contribution of food to energy and nutrients showed that the former included all food items of greatest relevance to the diet in the sample studied.

The food list of the proposed FFQ was supplemented with food items considered

Table 5 – Food items and portion sizes reported in the 24-hour dietary recalls of adults from Cuiabá, Brazil, 2007.

Food items	Reference portion sizes					
	Portion 1	(g)	Portion 2	(g)	Portion 3	(g)*
Rice	1-2 tablespoon	45*	1 tablespoon	60	2 tablespoons or more	150
Beef	1 steak/medium size	85	2 steaks/medium size	170	-	-
Beans	½ medium-size ladle	43	1 medium-size ladle	86	2 medium-size ladles or more	215
Soft drinks	1 large cup	240**	2 large cups	480**	3 large cups or more	840**
Crystal sugar	1 tablespoon	15	2 tablespoons or more	37.5*	-	-
Infusion coffee	1 cup	50**	2 cups	100**	3 cups or more	175**
Bread	1 unit/slice	50	2-4 units/slices	150*	5 units/slices or more	275
Lettuce	1-2 leaves	6*	3-4 leaves	21*	5 leaves or more	33
Tomato	½ medium-size unit	45	1-2 medium-size units	67.5*	3 medium-size units or more	157.5
Chicken	1 medium-sized	65	2 medium-sized or more	162.5*	-	-
Whole milk	1 large cup	240**	2 large cups	480**	-	-
Appetizers	1 medium-size unit	50	2 medium-size units or more	125*	-	-
Spaghetti	1 pasta server	90	2 pasta servers	180	3 pasta servers or more	315
Cheese	1 medium-size slice	225	2 medium-size slices	45	3 medium-size slices or more	78.5
Manioc	1 piece	65	2 pieces	130	3 pieces or more	227.5
Manioc flour	1 tablespoon	15	2 tablespoon	30	3 tablespoon or more	52.5

* average portion size (in grams)

** average portion size (in mL)

of interest to describe food intake in the sample studied. For example, we included seasonal items (fruits, leafy vegetables, and legumes), processed foods that may cause health effects (chocolate powder, cookies, canned meats and vegetables, yogurt, mayonnaise, alcoholic beverages, etc.) and regional foods and dishes (guarana powder, fish, meat and rice, fried plantain, etc.). These additions have made the list more comprehensive and minimized the possibility of missing important foods for the target population. The food list of the FFQ was reviewed by nutritionists of public and private health services in the city and they verified that the main foods of the diet of the local population were included in the instrument.

The quantity of food items included in the FFQ is consistent with that suggested by Fisberg et al.,⁴ whereby small food lists (less than 50 items) may underestimate food intake, and very large lists (over than 100 items) may tire respondents and thus overestimate food intake. Some authors also

argue that very large lists do not improve the validity of the FFQ when compared to smaller lists. Moreover, very large questionnaires tend to have higher rates of non-response, increasing study costs and duration.^{1,28,30}

We chose closed questions to report frequency of consumption. The consensus is that closed questions are more appropriate because they reduce coding time and transcription errors as well as missing questionnaires due to incomplete or incomprehensible answers.²⁶ In this study, we defined eight categories of frequency of consumption that are easy to understand and organized in a continuous decreasing order as proposed by Willett.¹ It should be noted that all items had the same frequency options. Frequency options in FFQs should range between five and 10; questionnaires with less than five categories may have significant amount of missing information while those with excess categories may be confusing. Most importantly, they must be able to discriminate foods that are most frequently consumed and those that are rarely consumed.^{1,10}

In the FFQ, standardized portion sizes were included in order to describe the food intake amount. The use of standardized portions in the FFQ is still controversial. Some authors claim that this information does not significantly improve the instrument's validity, arguing that in determining the instrument's validity the quantification of portion size may be less relevant than frequency of consumption.^{1,25} Despite these controversies, a review study found that 42% of the questionnaires reviewed provided information on portion size, 22% did not have this information and the remaining 36% asked respondents to describe the portion size regularly consumed.²⁶

Some questionnaires developed in Brazil use median or mean portion size as reference.²¹⁻²³ Given that reference portion sizes in FFQs should be adequate to the study population to avoid underestimating or overestimating intake,^{7,10} we found it appropriate to include in the FFQ the most frequently reported portions in the 24-hour dietary calls or traditional portion sizes for foods like bread and eggs (units).

One limitation of the present study is that only one 24-hour dietary recall was administered to construct the FFQ food list because a single administration may not be enough to capture information on usual dietary habits.²¹ We tried to minimize this limitation through two approaches: representation of all days of the week to capture different dietary intake;²² and the inclusion in the FFQ of food items rarely reported. For better discrimination of food intake it is key that the food list in the FFQ includes not only food items that are consumed by a fairly substantial proportion of the sample

studied but also those whose consumption varies among individuals.^{1,10,23,24}

The lack of a full Brazilian food composition database is a limiting factor for conducting studies on food intake. Software programs available in Brazil are mostly based on collected international tables. Databases developed in other countries have a limited application because the chemical composition of foods can vary significantly and food cooking and/or preparation are not always consistent with local dietary habits. Furthermore, many typical foods consumed by our population are not included in these tables.³⁵

Given the importance of diet in the etiology of various diseases and conditions, there has been growing interest in the development of more appropriate reliable instruments for the assessment of food intake. The strategy for FFQ development described in this study can provide input for the development of similar dietary assessment instruments in other scenarios and population groups.

Final considerations

The development of the FFQ took into account dietary habits and practices of the population studied. After appropriate verification of its validity and reliability, this questionnaire may be a valuable tool in studies investigating foods and their level of consumption that may be determinants (protective or risk factors) of nutritional status and overall health in the adult population of Cuiabá. This is a critical step to improve quality of information collected on food intake in this population.

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