Title

Design and Development of a Dialysis Food Frequency Questionnaire

Journal

Journal of Renal Nutrition, 21(3)

ISSN

1051-2276

Authors

Kalantar-Zadeh, Kamyar
Kovesdy, Csaba P
Bross, Rachelle
et al.

Publication Date

2011-05-01

DOI

10.1053/j.jrn.2010.05.013

Published in final edited form as:
J Ren Nutr. 2011 May ; 21(3): 257–262. doi:10.1053/j.jrn.2010.05.013.

Design and Development of a Dialysis Food Frequency Questionnaire

Kamyar Kalantar-Zadeh, MD, MPH, PhD[1,2,3], **Csaba P Kovesdy, MD**[4,5], **Rachelle Bross, RD, PhD**[1], **Debbie Benner, RD**[6], **Nazanin Noori, MD, PhD**[1], **Sameer B Murali, MD**, **Torin Block, BA**[7], **Jean Norris, DrPH, RD**[8], **Joel D Kopple, MD**[1,2], and **Gladys Block, PhD.**[7,8]

[1] Harold Simmons Center for Chronic Disease Research and Epidemiology, Los Angeles Biomedical Research Institute at Harbor-UCLA Medical Center, Torrance, CA

[2] David Geffen School of Medicine at UCLA, Los Angeles, CA

[3] Departments of Epidemiology or Community Health Sciences, UCLA School of Public Health, Los Angeles, CA

[4] Division of Nephrology, Salem Veterans Affairs Medical Center, Salem Virginia

[5] Department of Medicine, University of Virginia, Charlottesville, Virginia

[6] DaVita Inc., El Segundo, CA

[7] NutritionQuest, Berkeley, CA

[8] Department of Public Health Nutrition, University of California, Berkeley, CA

Abstract

OBJECTIVES—Periodic assessment of dietary intake across a given dialysis population may help improve clinical outcomes related to such nutrients as dietary protein, phosphorus, or potassium. Whereas dietary recalls and food records are used to assess dietary intake at individual level and over shorter time periods, food frequency questionnaires (FFQ) are employed to rank subjects of a given population according to their nutrient intake over longer time periods.

DESIGN—To modify and refine the conventional Block's FFQ in order to develop a dialysis patients specific FFQ.

SETTING—Eight DaVita outpatient dialysis clinics in Los Angeles area, which participated in the "Nutrition and Inflammation in Dialysis Patients" (NIED) Study.

PATIENTS—154 maintenance hemodialysis (MHD) patients

MAIN OUTCOME MEASURE—Dietary intake of participating MHD patients using a 3-day food record, supplemented by a person-to-person dietary interview, to capture food intake over the last hemodialysis treatment day of the week and the 2 subsequent non-dialysis days.

Correspondence: Kamyar Kalantar-Zadeh, MD, MPH, PhD, Harold Simmons Center for Chronic Disease Research and Epidemiology, Los Angeles Biomedical Research Institute at Harbor-UCLA Medical Center, 1124 West Carson Street, C1-Annex, Torrance, CA 90509-2910, Phone: 310-222-3891, Fax: 310-782-1837, kamkal@ucla.edu.

Relevant Potential Conflict of Interest: TB, GB and JN are related to NutritionQuest™ (Berkeley, CA), which owns and provides Block FFQs including the Dialysis FFQ. Other authors have declared none

RESULTS—Analyses of the food records identified the key contributors to the daily nutrient intake in the 154 participating MHD patients. A "Dialysis-FFQ" was developed to include approximately 100 food items representing 90% of the patients' total food intake of the NIED Study population. Distinctions were made in several food items based on key nutritional issues in dialysis patients such as protein, phosphorus and potassium.

CONCLUSIONS—We have developed a "Dialysis FFQ" to compare and rank dialysis patients according to their diverse nutrient intake. Whereas, the Dialysis-FFQ may be a valuable tool to compare dialysis patients and to identify those who ingest higher or lower amounts of a given nutrient, studies are needed to examine the utility of the Dialysis-FFQ for nutritional assessment of dialysis patients.

Keywords

Dietary assessment; chronic kidney disease (CKD); dialysis; dietary recalls; food records; dialysis food frequency questionnaire (FFQ); nutritional epidemiology

Introduction

Assessment of food intake is an important task in the management of chronic kidney disease (CKD) patient populations. In addition to dietary recalls and food records, which are usually used to assess dietary intake at the individual level and over shorter periods of time, food frequency questionnaires (FFQ) are also routinely employed to rank subjects of a given population according to their nutrient intake over longer time periods.[1] With increasing number of CKD patients including those undergoing maintenance dialysis treatment in outpatient dialysis clinics, periodic assessment of dietary intake and comparing dietary intake of dialysis patients with each other may help improve clinical outcomes related to diet.[2] In particular, dietary control of phosphorus and potassium or provision of adequate dietary protein intake may lead to improvement of nutritional status and survival in CKD patients.[3, 4] Indeed two recent studies using Block's FFG showed that higher intake of dietary phosphorus[5] or potassium intake[6] was associated with increased mortality in maintenance hemodialysis (MHD) patients, who were followed for up to 5 years. Encouraged by the usefulness of the Block's FFQ in ranking MHD patients according to their nutrient intake and detecting the unprecedented associations of dietary phosphorus and potassium with patient survival, we decided to disclose the process of design and development of a dialysis patient specific FFQ, which is derived from the Block's FFQ and which is based on examining the food intake data derived from a cohort of 154 MHD patients who were thoroughly investigated during the "Nutrition and Inflammation in Dialysis Patients" (NIED) Study.[7] The main objectives of the NIED Study are to examine the longitudinal associations of food intake and nutritional status with clinical outcomes and to develop tools that can better assess diet and nutrition in dialysis patients.[7]

Design and Development of the FFQ

One of the original goals of the NIED Study [7] was to design and develop a dialysis patient specific FFQ in collaboration with Gladys Block, PhD, and the team in NutritionQuest, Berkeley, CA. The task started with developing the appropriate food list followed by the general steps used for all Block questionnaires or dietary screeners.[8, 9] In general, detailed 24-hour recall or multiple-day record data are used to identify which foods are the key contributors to the nutrients of interest. For the standard Block FFQs this is done using the dietary data captured during the *National Health and Nutrition Examination Survey* (NHANES).[8, 9] All reported foods are grouped into similar categories (e.g., all forms of green beans are given the code "Green beans".) The resulting food categories or items are

then ranked, from the top down, in terms of their contribution to the total population intake of a particular nutrient. Depending on the desired length of the questionnaire, food items are generally chosen from the top down until the cumulative list represents a given percentage of total intake, i.e., 80% for a reduced food list, such as food screeners, or 90% for a full-length list, such as Block FFQs. This approach was also used to develop the priority food list of the dialysis patients using the data from the substudy of the NIED Study. [7, 10–13] In lieu of nationally representative general population data, such as NHANES, that are usually used to design the FFQ in otherwise healthy individuals, we used data from the target population, i.e., the NIED study participating MHD patients, who have been examined extensively.[10–17]

Patients

The original NIED Study patient cohort was derived over 5 years from a pool of over 3,000 MHD outpatients in eight DaVita chronic dialysis clinics in the South Bay Los Angeles area (see the NIED Study website at www.NIEDStudy.org for more details).[7, 18, 19] Included were outpatients who had been undergoing MHD treatment for at least 8 weeks, who were 18 years or older and who signed the Institutional Review Board approved consent form. Participants with acute infections or an anticipated life expectancy of less than six months (e.g. due to a metastatic malignancy or advanced HIV/AIDS disease) were excluded. From October 1, 2001, through December 31, 2006, a total of 893 HD patients from eight DaVita dialysis facilities in the Los Angeles South Bay area signed the informed consent form, and 154 of these patients were invited randomly to sign an additional consent form for participation in a substudy to undergo additional tests including a 3-day diet diary at the General Clinical Research Center (GCRC) in Harbor-UCLA campus.

Dietary Data Recording and Analyses

The 154 HD patients in the NIED Substudy provided a 3-day diet diary that included the last hemodialysis treatment day of the week (either Friday or Saturday) and 2 subsequent non-dialysis days (Saturday, Sunday, and/or Monday) A trained GCRC dietitian reviewed the diet record data in while in personal contact with the patients and conducted a supplementary dietary interview to fill in missing data. Collected dietary data, including oral nutritional supplements and vitamins, were converted electronically and analyzed using “Nutrition Data Systems for Research” (NDSR), Version 2005 (Minneapolis, MN). As shown in Table 1, patients were 53±14 years old (mean ± SD), and included 57% men, 40% African Americans, 38% Hispanics, and 62% diabetics. The mean dialysis vintage time was 42.1±33.7 months. Post-dialysis dry weight (mean±SD) was 74.5±18.4 kg (min: 42.6, max: 172.1 kg), and 3-month averaged Kt/V (single pool) was 1.58±0.28. The averaged dietary intake of the study population for selected food items, derived from the 3-day food record, can also be found in Table 1 using the software program known as “Minnesota Nutrition Data System for Research (NDSR), from the University of Minnesota, Rochester, MN. The Minnesota NDSR is a Microsoft Windows based dietary analysis program designed for the collection and analyses of 24-hour dietary recalls and food records, menus, and recipes. Calculation of nutrients occur immediately providing data per ingredient, food, meal, and day in report and analysis file formats. The software includes a dietary supplement assessment module so that nutrient intake from both food and supplemental sources may be captured and quantified. More information can be obtained under the website http://www.ncc.umn.edu/products/ndsr.html

The resulting dietary data included 5,753 “food mentions”, i.e., the entire amount of food items for all 154 patients combined. The most frequent food items reported by the study participants are listed in Table 2. These data were coded into broad food groups appropriate for inclusion on the Dialysis-FFQ according to Gladys Block’s selections. For example, the

202 mentions of rice, fried rice and other types of rice were all assigned a single code, “Rice and dishes made with rice”. All foods mentioned on the three-day records were coded into 141 food items, which were subsequently ranked in terms of their contribution to the total population intake of a particular nutrient. For instance, the three day diet records indicated that “white bread” accounted for 6.45% of all calories consumed by all subjects and was the single major source of energy intake by the MHD patients. “Rice and dishes made with rice” was the No. 2 source, and contributed 4.6% to total energy intake. The cumulative contribution of these two food items was 11.0% of all calories. Foods totaling 83% of the patient’s energy intake are shown in Table 2. These types of rankings were generated for several nutrients. Food items were candidates for inclusion in the questionnaire if they were in the top cumulative 90% of nutrient contribution of the calories, protein, phosphorus, potassium, sodium, vitamin A, vitamin C and water.[20] Because these nutrients cover several dissimilar food groups, the resulting food list also has good coverage for most nutrients of interest, even though the 154 MHD patients were quite diverse racially and ethnically (see Table 1), and included other nutrients that were not specifically targeted.

After the preliminary development of the food list, input was sought from several renal dietitians and nephrologists from geographically representative areas of the United States. Modifications and distinctions were made to capture nutrients of particular interest with regard to the intake of dialysis patients, and to reflect wording and food types that would be widely understood. For example, for soft drinks, information is captured not only on whether they are cola-type drinks (to capture phosphorus intake),[3] but also on whether they are low-calorie or regular sodas (to capture energy intake.) The Dialysis FFQ also distinguishes high-protein and low-protein meal replacement drinks. Information concerning the use of reduced-fat milk, lunch meats, whole-wheat bread and vitamin supplements was obtained.

The Dialysis-FFQ

The resulting ”Dialysis FFQ” is approximately 100 items long, and takes approximately 30–40 minutes to complete. Portion size is requested for each food item. For unitary items it is requested to provide their number (“How many”). For non-unitary items, a portion size graphic aids the respondent in portion size assessment. Portion size is considered important in dialysis patients, in relation to controlling liquids sodium, phosphorus and potassium intake, as well as for assessing adequate energy and protein intake. Nutrient content for items on the questionnaire is based on the USDA nutrient database from the 2005 version of the *Food and Nutrient Database for Dietary Surveys* (FNDDS). For more information about FNDDS, see http://www.ars.usda.gov/Services/docs.htm?docid=7673

It is important to note that the time frame covered by the questionnaire was limited to the previous three months to reflect the potentially changing nature of the dietary intake of dialysis patients. The sample of the Dialysis FFQ (see Appendix) contains our latest full-length questionnaire, available through NutritionQuest (www.nutritionquest.com). The refined “Portion size pictures” (see electronic Appendix) contains a scanned image of the portion size assessment tool. In addition to a scannable, paper/pencil form, the Dialysis-FFQ can also be made available in a computerized format that can be used for self- or interviewer-based administration, online via the web, or offline on a PC. Consistent wording has been maintained between paper/pencil and computerized questionnaires to permit comparability when using multiple modes of administration.

Validity of Dialysis-FFQ

Predictive validity may be examined to determine whether the results of the FFQ are related to other outcomes of interest such as survival. The earlier Block’s FFQ has recently tested in

the NIED Study and shown to be associated with survival, in that higher dietary phosphorus or potassium intake are predictors of increased death risk.[5, 6] The exact version of the Dialysis-FFQ presented here has not been subjected to *de novo* validation against other forms of dietary assessments in dialysis patients. However, the demonstrated predictive validity of the earlier Block's FFQ version,[5, 6] and the fact that the current version has been designed specifically for this patient population, suggests the promise of validity. Further validation research is planned.

Conclusions

In order to provide optimal care to individuals with CKD, in particular to dialysis patients, dietary evaluation and nutritional management are imperative. Accurate assessment of dietary intake is also important for outcomes research in CKD patients including studies related to the putative relationship between food intake and clinical outcomes.[2] Imposed dietary restrictions are employed routinely in dialysis patients, some of which may cause more harm than help, such as restricting protein intake in order to lower the serum phosphorus levels.[21] The *Dialysis FFQ* may be a useful tool in examining diet related outcome in CKD patient studies. The advantages of the Dialysis-FFQ include: convenience, esp. if self-administered for use in large populations; large temporal catchment (months to years) and, hence, robust to the effect of seasonal variations; relatively high degree of reliability in ranking subjects across each food item; and feasibility and low coast for large scale epidemiologic studies. The limitations include: tendency towards under estimation of nutrient intake at individual level; lack of accuracy to use to assess the amounts or adequacy of dietary intakes of individuals or small groups of people; inadequate coverage to include all available food items; and inclusion of diverse varieties of a given food under one single food item and, hence, failure to capture significant differences across different food subtypes. [1]

Whereas the Dialysis-FFQ may be a valuable tool to compare dialysis patients and to identify those who ingest higher or lower amounts of a given nutrient, it should not be used to assess he absolute dietary intake of a dialysios patient at the individual level and without comparing him/her to the collective. We suggest using the Dialysis-FFQ to rank dialysis patients pertaining to the ingestion of the nutrient in question within a given study population. Studies are needed to further examine strengths and limitations of the Dialysis FFQ.

Acknowledgments

Funding Source: The manuscript was supported by Dr. Kalantar-Zadeh's research grants from the National Institute of Diabetes, Digestive and Kidney Disease of the National Institute of Health (K2361162 and R21 DK078012), a research grant from DaVita Clinical Research, and a philanthropic grant from Mr. Harold Simmons.

References

1. Bross R, Noori N, Kovesdy CP, Murali SB, Benner D, Block G, Kopple JD, Kalantar-Zadeh K. Dietary assessment of individuals with chronic kidney disease. Semin Dial. 2010 [in press].
2. Kovesdy CP, Shinaberger CS, Kalantar-Zadeh K. Epidemiology of dietary nutrient intake in ESRD. Semin Dial. 2010 [in press].
3. Kalantar-Zadeh K, Gutekunst L, Mehrotra R, Kovesdy CP, Bross R, Shinaberger CS, Noori N, Hirschberg R, Benner D, Nissenson AR, Kopple JD. Understanding sources of dietary phosphorus in the treatment of patients with chronic kidney disease. Clin J Am Soc Nephrol. 2010; 5:519–30. [PubMed: 20093346]

4. Noori N, Sims JJ, Kopple JD, Shah A, Colman S, Shinaberger CS, Bross R, Mehrotra R, Kovesdy CP, Kalantar-Zadeh K. Organic and inorganic dietary phosphorus and its management in chronic kidney disease. Iran J Kidney Dis. 2010; 4:89–100. [PubMed: 20404416]
5. Noori N, Kalantar-Zadeh K, Kovesdy CP, Bross R, Benner D, Kopple JD. Association of dietary phosphorus intake and phosphorus to protein ratio with mortality in hemodialysis patients. Clin J Am Soc Nephrol. 2010; 5:683–92. [PubMed: 20185606]
6. Noori N, Kalantar-Zadeh K, Kovesdy CP, Murali SB, Bross R, Nissenson AR, Kopple JD. Dietary Potassium Intake and Mortality in Long-Term Hemodialysis Patients. Am J Kid Dis. 2010 [in press].
7. Colman S, Bross R, Benner D, Chow J, Braglia A, Arzaghi J, Dennis J, Martinez L, Baldo DB, Agarwal V, Trundnowski T, Zitterkoph J, Martinez B, Khawar OS, Kalantar-Zadeh K. The Nutritional and Inflammatory Evaluation in Dialysis patients (NIED) study: overview of the NIED study and the role of dietitians. J Ren Nutr. 2005; 15:231–43. [PubMed: 15827897]
8. Block G, Dresser CM, Hartman AM, Carroll MD. Nutrient sources in the American diet: quantitative data from the NHANES II survey. II. Macronutrients and fats. Am J Epidemiol. 1985; 122:27–40. [PubMed: 4014199]
9. Block G, Dresser CM, Hartman AM, Carroll MD. Nutrient sources in the American diet: quantitative data from the NHANES II survey. I. Vitamins and minerals. Am J Epidemiol. 1985; 122:13–26. [PubMed: 4014190]
10. Bross R, Chandramohan G, Kovesdy CP, Oreopoulos A, Noori N, Golden S, Benner D, Kopple JD, Kalantar-Zadeh K. Comparing Body Composition Assessment Tests in Long-term Hemodialysis Patients. Am J Kidney Dis. 2010
11. Dukkipati R, Kovesdy CP, Colman S, Budoff MJ, Nissenson AR, Sprague SM, Kopple JD, Kalantar-Zadeh K. Association of Relatively Low Serum Parathyroid Hormone With Malnutrition-Inflammation Complex and Survival in Maintenance Hemodialysis Patients. J Ren Nutr. 2010
12. Park JC, Kovesdy CP, Duong U, Streja E, Rambod M, Nissenson AR, Sprague SM, Kalantar-Zadeh K. Association of serum alkaline phosphatase and bone mineral density in maintenance hemodialysis patients. Hemodial Int. 2010
13. Shantouf RS, Budoff MJ, Ahmadi N, Ghaffari A, Flores F, Gopal A, Noori N, Jing J, Kovesdy CP, Kalantar-Zadeh K. Total and Individual Coronary Artery Calcium Scores as Independent Predictors of Mortality in Hemodialysis Patients. Am J Nephrol. 2010; 31:419–25. [PubMed: 20389057]
14. Bross R, Zitterkoph J, Pithia J, Benner D, Rambod M, Kovesdy CP, Kopple JD, Kalantar-Zadeh K. Association of serum total iron-binding capacity and its changes over time with nutritional and clinical outcomes in hemodialysis patients. Am J Nephrol. 2009; 29:571–81. [PubMed: 19136818]
15. Raj DS, Shah VO, Rambod M, Kovesdy CP, Kalantar-Zadeh K. Association of soluble endotoxin receptor CD14 and mortality among patients undergoing hemodialysis. Am J Kidney Dis. 2009; 54:1062–71. [PubMed: 19699018]
16. Rambod M, Bross R, Zitterkoph J, Benner D, Pithia J, Colman S, Kovesdy CP, Kopple JD, Kalantar-Zadeh K. Association of Malnutrition-Inflammation Score with quality of life and mortality in hemodialysis patients: a 5-year prospective cohort study. Am J Kidney Dis. 2009; 53:298–309. [PubMed: 19070949]
17. Shantouf R, Kovesdy CP, Kim Y, Ahmadi N, Luna A, Luna C, Rambod M, Nissenson AR, Budoff MJ, Kalantar-Zadeh K. Association of serum alkaline phosphatase with coronary artery calcification in maintenance hemodialysis patients. Clin J Am Soc Nephrol. 2009; 4:1106–14. [PubMed: 19423565]
18. Rambod M, Kovesdy CP, Bross R, Kopple JD, Kalantar-Zadeh K. Association of serum prealbumin and its changes over time with clinical outcomes and survival in patients receiving hemodialysis. Am J Clin Nutr. 2008; 88:1485–94. [PubMed: 19064507]
19. Kalantar-Zadeh K, Kopple JD, Kamranpour N, Fogelman AM, Navab M. HDL-inflammatory index correlates with poor outcome in hemodialysis patients. Kidney Int. 2007; 72:1149–56. [PubMed: 17728705]

20. Kalantar-Zadeh K, Kopple JD, Deepak S, Block D, Block G. Food intake characteristics of hemodialysis patients as obtained by food frequency questionnaire. J Ren Nutr. 2002; 12:17–31. [PubMed: 11823990]

21. Shinaberger CS, Greenland S, Kopple JD, Van Wyck D, Mehrotra R, Kovesdy CP, Kalantar-Zadeh K. Is controlling phosphorus by decreasing dietary protein intake beneficial or harmful in persons with chronic kidney disease? Am J Clin Nutr. 2008; 88:1511–8. [PubMed: 19064510]

Appendix

1. Dialysis-FFQ (see attached PDF)
2. Portion Size

Table 1

Demographic and clinical data and reported dietary intakes of 154 MHD patients using 3-day food record

Variable	Value (mean±SD or count)
Age (years)	53±14
Men (%)	58
Diabetes (%)	52
Race/ethnicity (%)	
African-American	43
Hispanic	38
Weight (kg)	74±21
Height (inch)	66±4
Body mass index (kg/m^2)	26.1±6.0
Energy intake, kcal/d	1655±635
Carbohydrate intake, g/d	205±83
Protein intake, g/d	67±28
Fat intake, g/d	64±29
Phosphorus intake, mg/d	881±350
Calcium intake, mg/d	446±240
Potassium intake, mg/d	1812±799
Sodium intake, mg/d	2625±1145
Iron intake, mg/d	54±498
Magnesium intake, mg/d	2.4±1.2
Zinc intake, mg/d	8.6±4.2
Manganese intake, mg/d	2.4±1.2
Copper intake, mg/d	0.9±0.4
Selenium intake, mg/d	102±44
Vitamin A, IU/d	5507±5711
Vitamin B1, mg/d	1.4±0.6
Vitamin B2, mg/d	1.4±0.6
Niacin, mg/d	19.0±8.3
Vitamin B6, mg/d	1.4±0.7
Folate, mg/d	328±150
Vitamin B12, mg/d	3.5±2.3
Vitamin C, mg/d	58±71
Vitamin D, mg/d	2.9±2.5
Vitamin E, mg/d	7.1±14.2
Vitamin K, mg/d	71±58
Fiber, g/d	13±7

Table 2

Ranked sources of energy intake, based on three-day diet records from 154 dialysis patients Foods totaling 83% of patient energy intake

Rank	Food item	%kcal	Cum.percent	mentions
1	White bread	6.45	6.45	344
2	Rice or dishes made with rice	4.58	11.03	198
3	Eggs or breakfst sandwiches w	4.12	15.15	181
4	Cake, sweet rolls, pastry, pan	3.06	18.22	75
5	Beef (fat off)	2.94	21.16	86
6	Chicken not fried (no skin)	2.87	24.02	116
7	Soda - Not cola	2.78	26.80	165
8	Mixed dish with beef or pork	2.32	29.13	50
9	Burritos, tamales, enchiladas,	2.20	31.33	31
10	Hamburgers	2.14	33.47	44
11	Cookies, granola bars	2.04	35.50	84
12	Real fruit juice	1.96	37.47	126
13	Fried chicken	1.91	39.37	40
14	Chicken not fried (with skin)	1.85	41.23	58
15	French fries, fried potatoes	1.83	43.06	50
16	Tacos	1.77	44.83	37
17	Pie (except sweet potato, pump	1.59	46.41	32
18	Cooked cereal	1.58	48.00	66
19	Non-dairy creamer	1.58	49.58	215
20	Doughnuts	1.55	51.13	28
21	Fish not fried	1.52	52.65	43
22	Noodles, macaroni, pasta	1.46	54.11	44
23	Corn tortillas	1.35	55.46	76
24	Flour tortillas	1.24	56.70	43
25	Pizza	1.10	57.80	17
26	Pork, including chops, cutlets	1.07	58.87	35
27	Apples or pears	1.00	59.87	108
28	Sausage	0.99	60.86	32
29	Soup (except vegetable soup)	0.98	61.85	43
30	Ice cream	0.98	62.83	13
31	Cheeseburgers	0.94	63.77	12
32	Potato chips, corn chips	0.90	64.67	27
33	Pancakes or waffles	0.87	65.55	21
34	Sugar	0.86	66.41	173
35	Drinks with some juice	0.85	67.26	50
36	Refried beans	0.80	68.06	21
37	Mixed dish with chicken	0.79	68.85	19
38	Other, misc, spices, seasoning	0.79	69.64	35
39	Margarine	0.78	70.42	119

Rank	Food item	%kcal	Cum.percent	mentions
40	Canned fruit	0.73	71.16	58
41	Cereal (not fiber or sweetened	0.73	71.89	42
42	Bacon	0.72	72.61	48
43	Biscuits, muffins, croissants	0.71	73.32	29
44	Spaghetti with tomato sauce	0.70	74.03	17
45	Any other vegetables	0.69	74.72	131
46	Tuna, tuna salad, tuna sandwic	0.66	75.39	24
47	Drinks like Glucerna, Boost, S	0.66	76.04	22
48	Grits	0.65	76.70	26
49	Any other fresh fruit	0.65	77.35	102
50	Crackers	0.65	78.00	44
51	Fried fish	0.65	78.64	12
52	100% whole wheat bread	0.63	79.27	37
53	Mayonnaise	0.61	79.88	64
54	Corn bread	0.61	80.48	18
55	Beef (fat on)	0.60	81.09	10