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The Iranian Food Consumption Program (IFCP), A Unique Nutritional Software in Iran

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Abstract

The Iranian Food Consumption Program (IFCP), a unique program in Iran was developed to aim accurate calculation of nutrient intakes in relation to heart health investigation released in Isfahan Cardiovascular Research Center in March 1998 for the first time. The new versions came out along changes in computer technology.

This interview-based program is designed to gather data through designed questionnaires in two dietary and non-dietary parts under an individual code number for each subject. The interview can be repeated to nine times for each code number. The non-dietary questionnaires are used to obtain information about personal, demographic and anthropometric characteristics, lipid profiles, personal and family history for cardiovascular disease and its risk factors, fasting blood sugar, blood pressure and heart rate records as well as physical activity data.

The dietary data collection is flexibility programmed to be able to match easily with different methods of nutrition assessment especially record-assisted 24-hour recall method. A photographic food atlas makes food recalling accurate, easily and in real quantity and quality amounts. Therefore, a separate food list is made for each subject containing foods, ingredients and composed nutrients by record. Food analysis is performed to obtain daily nutrients intakes extremely accurate according to Iranian Food Table with over 1377 food items and values of 45 nutrients.

The ultimate file can be exported in nearly eleven formats for statistical analysis. Consequently, the nutrient status can be easily investigated in designed studies for individuals, groups and populations especially concerning heart health. Also, the validity of the software was established by a comparative study through a trial and error. IFCP is useful for diet therapy, dietetic practice, nutrition research and epidemiological survey.

Key words: Cardiovascular disease, Diet therapy, Nutrition, Nutrient-intake questionnaire, Software package, Risk factor

Introduction

Nutrition is one of the effective factors on health and growth. Results from two studies in US indicate that individuals can help themselves to prevent disease and disability as well as aid the healing process (10, 8). Therefore, improper nutrition has been a great concern of scientists and efforts have forever been made to develop good techniques to investigate the food intake of individuals and groups. Different techniques and methods, such as food record and (24-hour) dietary recall have been used, individually or combined.

Dietitians select a dietary analysis software program (1, 11) whose nutrition database is accurate, well documented and do all the tasks without any difficulty. Besides, nutrition researchers are interested in dietary analysis systems that are easy to use. In many parts of the world, several computer software programs are available for delivering a variety of nutrition services, including patients interview for nutritional assessment and nutrient analysis (1-4, 6, 7, 9, 12), but there has been no such a thing in Iran so far.

Therefore, to determine the nutrient intake and also study the association between all the nutrients and heart health in a project named Isfahan CVD Risk Factor Survey, 1998, a computer program was developed in Isfahan Cardiovascular Research Center.

This Windows-based Iranian package is a nutrient calculation system and a reliable tool for accurately calculating nutrients of Iranian dishes with all their complexities through an atlas of photographs mainly of traditional and other foods Iranian people consumed by habit in quantity and quality levels. In addition, the high flexibility in IFCP for changing the database, dietary nutrient assessment methods, and computer questionnaires is remarkable.

This software is useful in routine diet therapy and dietetic practice, nutrition research as well as epidemiological studies.

Software Features

The program is run in Windows System. There are Drop-down menus including Personal Characteristics, Food Consumption Assessment, Physical Activity Questionnaire, Statistical Report, Tools and Help. The data are collected through designed self-guide questionnaires in each menu to direct user easily through interviewing with subject. Of note, data entry is more convenient with the mouse.

In Personal Characteristic menu, a questionnaire is represented to record following information: Personal characteristics, demographics, marital status, occupation, education, anthropometrics, smoking status, serum or plasma lipids and fasting blood sugar, blood pressure and heart rate measurements, own previous and family history for cardiovascular disease (CVD) and its risk factors, medication and food regimen status.

In Food Consumption Assessment menu, user implements the main collecting food data. The methods for food data collection flexibility include the 24-hour dietary recalls (mainly record-

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assisted 24-hour recalls), food frequency, diet history etc. through interviewing or food records. In addition, dietary regimens can be easily valued in nutrients for individuals with different nutrition demands.

Subjects assisted with a manual checklist participate in a computer-assisted interview. The checklists are for the food data to be checked for any omissions, faults or ambiguities.

The food name is simply entered with no need for entry of codes. There is an access point for each food so that the retrieval function can be easily done through searching.

Subjects describe their food consumption in quantity and quality visually from an Iranian photographic food atlas. It represents colored photographs of foods, dishes, fruits, nuts, sweets, etc. with different portion sizes. The portion sizes are shown using measuring cups, spoons, glasses, etc. Therefore, any consumed portion serving or the recipe ingredients for each dish can be conveniently selected on the screen. For dishes, portion size estimation is easily provided in format of different common serving sets. For ready-made foods in restaurants, one can select it and define its portion size. The, the system automatically converts data into Subsequently, the system equivalent amounts of nutrients.

The amount of salt in foods, like that of other ingredients, is obtained by self-report from participants, who are requested to collect the same amounts of salt added to foods at the table in a small packet, to be weighed afterwards.

As explained, data collection is done as real as possible. In addition, the calculation order is designed in a way that the self-report errors become apparent. Therefore, the food consumption data is collected as detailed as possible to capture highly accurate nutrient calculation.

For subjects who are unable to provide the necessary level of detail, IFCP provides a standardized menu for consumed dish. At the end of each interview, the collected data is represented as a dBase file in a food list whole-food name or ingredient level optionally.

In Physical Activity menu, there are 16 questions to estimate the energy for the daily activities and sports as the grades ranging form 1 to 4 that are likely to be performed by an individual. Data can be collected through 9-referral interviews as desired.

The interview methodology can flexibly change through Tools menu corresponding to the purposed design of the research project.

Moreover, the language of the software can easily be changed from Persian to English.

Hardware Features

The minimum requirements necessary to run the IFCP are as follows:

Intel Pentium processor (speed: 90Mhz), a VGA or high resolution color monitor (640×480), memory as 32MB RAM (>64MB RAM recommended), 130MB free space hard disk, a keyboard (mouse recommended). A soundboard, a CD-ROM drive and a loudspeaker are recommended for better usage.

Database Features

IFCP contains an Iranian comprehensive food table with over 1377 foods and values of up to 45 nutrients. One of the sources is a food table published by The National Nutrition and Food Technology Research Institute, Tehran, Iran (5).

Homemade foods are not considered as individual items but as separate recipe ingredients (these ingredients have been coded in the food table). Except for salt, spices and other miscellaneous items have not been considered as separate food items.

Ready-made foods (130 foods obtained from Iranian standard food manufacturers and cookery books) are specially coded in the program. It can become updated along with the food industry and market.

The nutrients are as follows: calories, proteins, carbohydrates, fiber, sugar, fat, saturated fat (SFA), monounsaturated fat (MUFA), polyunsaturated fat (PUFA), omega 3 and omega 6 fatty acids, cholesterol, vitamin A (IU), vitamin A (RE), thiamin, riboflavin, niacin, vitamin B6, folate, vitamin B12, vitmain C, retinol, carotenoids, beta carotene, vitamin D, vitamin E, phosphor, iron, sodium, potassium, calcium, copper, magnesium, manganese, selenium, zinc, MUFA/PUFA, SFA/PUFA. Other nutrient ratios are easily available by required calculation because each record in the food table has a category code for food analysis in nutrient ratio level.

Final output files

In Statistical Report menu, the output files are prepared for the following information: patient characteristics, physical activity and dietary data calculated in several formats (including mean daily nutrient intake in all referrals, mean daily nutrient intake in each referral and nutrient intakes per a whole-food serving).

All the above files can be obtained in one output file as desired options. Also, the back-up utilities for output files are provided. IFCP has high flexibility to edit data as Cut, Copy and Paste functions.

Data Analysis

Data can be exported in several formats for statistical analysis including the following:

FoxPro (FoxBASE+), FoxPro (VisiCalc), Microsoft Multiplan ver 4.0 (MOD), System data format (SDF), Symbolic Lind (SYLK), Lotus 1-2-5 ver 2x (WK1), Lotus 1-2-3 ver 1a (WKS), Lotus Symphony ver 1.1 or 1.2 (WRI), Lotus Symphony ver 1.0 (WRK), Excel ver 2.0 (XLS), Excel ver 5.0 (XL5).

Therefore, we can not only study dietary habits and CVD risk factors, but also investigate the possible associations between all these factors. The fields of two non-dietary questionnaires, nutrients and type of foods and also food groups are identified.

Other menus

Designing different questionnaires is possible thanks to Tool menu. Therefore, researchers can change the questionnaires as desired.

The Help menu, a comprehensive self-guidance to program.

Validation of Software

To validate the diet history IFCP, the food consumption of 20 men and women with ordinary diet and eating habits were

studied in two ways. They were asked to record the weight of all their foods and their recipes during 24 hours. Thereafter, energy and nutrients intakes were calculated. All participants were trained, and by one Micro Digital Computing scale all weight measurements were performed. By this method, the actual intake of all nutrients was obtained (golden standard). The day after, they were interviewed and their dietary history for this period entered IFCP and the intake of nutrients and energy was estimated again. This procedure was repeated three times. Mean weights of daily consumed foods assessed by IFCP software and the estimation based on weight was compared, and no significant difference was observed ($p>0.05$). To study the validity of the software, the correlation's of the pair of values from two methods were done,. Then strong associations between the nutrients values were obtained by two methods (energy: $r=0.91$, $p=0.000$, protein: $r=0.90$, $p=0.000$, carbohydrate: $r=0.96$, $p=0.000$, fat: $r=0.89$, $p=0.001$, and cholesterol: $r=0.86$). On the whole, the validity of the software is high.

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References

1. Buzzard IM, Price KS, Warren RA (1991). Consideration for selecting nutrient-calculation software: evaluation of the nutrient database. *Am J Clin Nutr*; 54:7-9.
2. Block G, Coyle LM, Hartman AM, Scoppa SM (1994). Revision of dietary analysis software for the health habits and history questionnaire. *Am J Epidemiol* 139:1190-6.
3. Dennison KF, Dennison D, Ward JY (1991). Computerized nutrition program: effect on nutrient intake of senior citizens. *J Am Diet Assoc*; 91(11):1431-2.
4. Frank GC, Pelican S (1986). Guidelines for selecting a dietary analysis system. *J Am Diet Assoc*; 86:72-5.
5. Food Composition Table. Tehran: National Nutrition and Food Technology Research Institute Publication; 1999.
6. Gregoire MB, Nettles MF (1994) Is it time for computer-assisted decision making to improve the quality of food and nutrient services? *J Am Diet Assoc*; 94:1371-4.
7. Mattes RD, Gabriel S (1988). A comparison of results from two microcomputer nutrient analysis software package and a mainframe system. *J Nutr Educ*; 20:70-5.
8. Nestle M, Gilbride JA (1990). Nutrition policies for health promotion in older adults: education priorities for the 1990s. *J Nutr Educ*; 22: 314-7.
9. Smucker R, Block G, Coyle L, et al (1989). A dietary and risk factor questionnaire and analysis system for personal computers. *Am J Epidemiol;* 129:445-9.
10. The Surgeon General's Report on Nutrition and Health (1988). Washington, DC: US Dept. of Health and Human Services, Public Health Service;. DHHS (PHS) publication 88-50210.
11. Thompson FE (1994). Dietary assessment resource manual. *J Nutr*; 124(suppl): 2245S-2317S.
12. Thompson JK, Dwyer JT (1987). Computer applications in out-patients nutrition services: fostering the coputer conection. *Clin Nutr*; 6:185-91.