Abstract

In the last two decades easy-to-use simple instruments have been developed and validated to assess specific aspects of the diet or a general profile that can be compared with a reference dietary pattern as the Mediterranean Diet or with the recommendations of the Dietary Guidelines. Brief instruments are rapid, simple and easy to use tools that can be implemented by unskilled personnel without specific training. These tools are useful both in clinical settings and in Primary Health Care or in the community as a tool for triage, as a screening tool to identify individuals or groups of people at risk who require further care or even they have been used in studies to investigate associations between specific aspects of the diet and health outcomes. They are also used in interventions focused on changing eating behaviors as a diagnostic tool, for self-evaluation purposes, or to provide tailored advice in web based interventions or mobile apps. There are some specific instruments for use in children, adults, elderly or specific population groups.

(Metodos especiales_Carmen Perez-Rodrigo.indd 91 17/02/15 10:40)

Key words: Dietary assessment. Screening. Rapid assessment. Brief instruments.
Rapid Assessment Methods were designed by Chambers and colleagues in the 70s for use in rural communities in developing countries and were modified later in the 80s. These methods, Rapid Rural Appraisal (RRA) and Participatory Rural Appraisal (PRA), based on qualitative evaluation methods, were developed to be used by fieldworkers in contexts with limited resources, lack of skilled trained personnel to conduct large surveys in order to identify problems and follow up, but where information is required for immediate action and decision adoption1.

Data collected by these methods help to draw a situational analysis map, identify and prioritize problems as well as to identify at risk groups. However, short methods are not useful to detect individuals at risk who may need immediate intervention due to their physiological status, condition or any other circumstances. The rapid assessment questionnaires developed over the last decades have attempted to answer those needs2.

Rapid assessment tools are described as questionnaires intended to identify key risk factors for malnutrition or inadequate consumption patterns for specific food groups. Based on these risk factors, appropriate algorithms are developed to compute scoring scales associated to each screening tool. Scores are usually categorized according to range levels in the scale and the subsequent corresponding appropriate actions or decisions to be adopted. Many of these instruments are designed in a user friendly format, so they can be used by nurses or social workers in their routine practice in Primary Health Care, in community settings for health promotion purposes and community interventions3,4.

The time and resources available in clinical practice, especially in Primary Health Care, make it difficult to implement comprehensive nutritional assessments. In addition, healthcare professionals often are not particularly well trained and skilled in nutritional assessment methodology. Therefore, easy-to-use rapid assessment tools ready to be used by staff without a specific training or specialized qualification are highly valuable5.

Nutrition screening tools had a major development in three main areas. On the one hand, in clinical practice to identify patients in situations that compromise their nutritional status and require an effective intervention either with a preventive or treatment aim, such as cardiovascular risk, cancer patients, candidates for certain surgery treatment patients or any other specific condition.

On the other hand, several tools have been developed for implementation in the elderly. Due to the specific physiological, clinical and socioeconomic characteristics associated with ageing processes, the elderly is an important at risk group and it is necessary to identify individuals who may be in situations vulnerable for malnutrition to provide them with adequate social and health care support.

Assessment of food habits is particularly interesting in childhood and adolescence to inform monitoring of adequate growth and development and for health promotion and nutrition education purposes. More recently new rapid assessment and self-evaluation tools have been developed in the context of health promotion interventions focused on modifying eating behaviours. Table I summarizes the different types of screeners developed in recent years with some examples, scope, targeted population group and main characteristics.

Short dietary assessment instruments

For some research and/or public health purposes a full-length questionnaire is not practical. Therefore, brief assessments and screening tools have been developed, usually to assess just one or two nutrients or food groups. They generally ask about frequency of consumption but do not include portion size. This kind of tools are useful to identify individuals with a very low or high intake. Brief instruments can be simplified, targeted food frequency questionnaires (FFQ) or questionnaires that focus on specific eating behaviors other than the frequency of consuming specific foods3-4.

Most of the focus in brief instrument development has been on fruits and vegetables and fats, but others have been developed for protein, calcium, sugar sweetened drinks and other food intake. Often, only 15 to 30 foods might be required to account for most of the intake of a particular nutrient. Food frequency type instruments to measure fruit and vegetable consumption range from a single overall question to 45 or more individual questions3-5.

Uses

These instruments can be useful in situations that do not require either assessment of the total diet or quantitative accuracy in dietary estimates. For example, a brief diet assessment of some specific components might be used to screen large numbers of individuals and rapidly identify and focus attention on those subjects or groups at greatest need for intervention1.

Brief instruments focusing on specific aspects of a dietary intervention have also been used to track changes in diet. However, it has been argued that responses to questions of intake that is directly related to intervention messages may be biased and that these instruments lack sensitivity to detect change. Use of a screener as the sole measure of change is not recommended when evaluating the intervention, because exposure to the intervention itself can create differential response bias in reporting in the intervention group relative to the control group3-4.

Brief instruments of specific dietary components such as fruits and vegetables, food habits of particular interest such as breakfast consumption or specific food...
Screeners and brief assessment methods

behaviours are often used for population surveillance. In the USA, the Risk Factor Monitoring and Methods Branch (RFMMB) has developed several short instruments that assess intake of fruits and vegetables, percentage energy from fat, fibre, added sugars, whole grains, calcium, dairy products, and red and processed meats which are used in the Centres for Disease Control and Prevention’s (CDC) Behavioural Risk Factor Surveillance System2-4,6,7. The Dietary Screener Questionnaire (DSQ) is one of the instruments developed by the RFMMB focused on the intakes of fruits and vegetables, dairy/calcium, added sugars, whole grains/fiber, red meat, and processed meat. The tool consists of 26-items which ask about the frequency of consumption in the past month of selected foods and drinks4.

Large studies such as National Health Surveys in many countries, the Health Behaviour in School-aged Children (HBSC) and other surveillance surveys include such instruments as well2,3. Brief instruments can also be used to examine relationships between some specific aspects of diet and other exposures4. Finally, some groups use short screeners to evaluate the effectiveness of policy initiatives7.

Brief instruments often combine food frequency questions and behavioural questions to assess multiple dietary patterns, even questions to reflect emotional eating and impulsive snacking behaviours. Some screeners have simplified answer options to reduce respondent burden by asking questions that require only Yes or No answers. The same approach has been used as a modification of the 24-hour recall. The instruments

---

**Table I**

*Type of Rapid nutrition and diet assessment instruments, target population and uses*

<table>
<thead>
<tr>
<th>Type of questionnaire</th>
<th>Examples</th>
<th>Target group</th>
<th>Uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community screener</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NSI Level I (DETERMINE)</td>
<td>Elderly</td>
<td>Primary Health Care</td>
<td>Social Services</td>
</tr>
<tr>
<td>Healthy Eating Index</td>
<td>Children, Adults</td>
<td>Primary Health Care</td>
<td>School Health</td>
</tr>
<tr>
<td>KIDMED</td>
<td>Children and young people</td>
<td>Primary Health Care</td>
<td>School Health, Health Promotion</td>
</tr>
<tr>
<td>Kreceplus</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CADET</td>
<td>Children</td>
<td>Primary Health Care</td>
<td>School Health, Health Promotion</td>
</tr>
<tr>
<td>CNQ</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MEDAS</td>
<td>Adults</td>
<td>Primary Health Care</td>
<td></td>
</tr>
<tr>
<td>DINE</td>
<td>Adults</td>
<td>Primary Health Care</td>
<td>Health Promotion</td>
</tr>
<tr>
<td>Surveillance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dietary Screener in the NHANES 2009-10</td>
<td>Adults, Children</td>
<td>Public Health, Health Promotion</td>
<td></td>
</tr>
<tr>
<td>Diet screener in HBSC</td>
<td>Adolescents</td>
<td>Public Health, Health Promotion</td>
<td></td>
</tr>
<tr>
<td>Diet screener in NHS</td>
<td>Adolescents, Adults</td>
<td>Public Health, Health Promotion</td>
<td></td>
</tr>
<tr>
<td>Dietary Screener in the 2010 NHIS Cancer Control Supplement (CCS)</td>
<td></td>
<td>Public Health, Health Promotion</td>
<td></td>
</tr>
<tr>
<td>Malnutrition screener</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subjective Global Assessment</td>
<td>Elderly, Hospital patients</td>
<td>Primary Health Care</td>
<td>Hospital, Homes for elderly</td>
</tr>
<tr>
<td>MNA</td>
<td>Elderly</td>
<td>Primary Health Care</td>
<td>Hospital</td>
</tr>
<tr>
<td>MNA-SF</td>
<td>Patients</td>
<td>Primary Health Care</td>
<td>Day Care centers</td>
</tr>
<tr>
<td>MUST</td>
<td>Hospital patients</td>
<td>Primary Health Care</td>
<td>Hospital</td>
</tr>
<tr>
<td>NSI. Level II and Level III</td>
<td>Elderly</td>
<td>Primary Health Care</td>
<td>Hospital</td>
</tr>
<tr>
<td>Health promotion and tailored advice</td>
<td>Pro Children</td>
<td></td>
<td>School Health, Health Promotion</td>
</tr>
</tbody>
</table>
Validiry

Screeners are shorter and less detailed than a total dietary assessment, therefore less accurate. However, calibrating a screener against the more precise 24-hour recall can help ensure that a screener is providing the best and most accurate estimates possible. Many short questionnaires using a food frequency approach have been developed and compared with multiple days of food records, dietary recalls, complete FFQs, or biomarkers. Single-exposure abbreviated FFQs have been developed and tested for protein, calcium, iron, isoflavones, phytoestrogens, soy foods, folate, sugar snacks, heterocyclic aromatic amines, and alcohol.

Some tools have been evaluated in cross-sectional general population studies. That is the case for the KIDMED questionnaire developed in Spain to assess adherence to the Mediterranean Diet, which was evaluated in the enKid population study. Other instruments have been validated in self-selected samples in intervention research.

Estimates of intake from short dietary assessment instruments are not as accurate as those from more detailed methods. This kind of assessment instruments may be most useful for characterizing median intakes in a population; discriminating among individuals or populations with regard to higher vs. lower intakes; examining interrelationships between diet and other variables; and comparing findings from a smaller study to a larger population study. However, short dietary assessment instruments generally are not useful for characterizing a population’s usual intake distribution. Such information is needed to estimate prevalence of intakes above or below a given level. They cannot be used either to accurately assess an individual’s intake and may not be appropriate to measure change in intervention studies.

Validation studies of the CDC and 5-A-Day brief instruments to assess fruit and vegetable intake have suggested that they often underestimate actual intake, unless portion size adjustments are considered. Following cognitive research findings, the revised version which included portion size questions was used in some studies suggesting better performance. However, results in community interventions were mixed. Fruit and vegetable consumption was significantly overestimated relative to multiple 24-hour recalls in some comparisons. Furthermore, the screener indicated change in consumption in both men and women while the 24-hour recalls did not show any.

A 17 item fat screener was used as an initial screen for high fat intake in the Women’s Health Trial and in the CDC’s Behavioral Risk Factor and Surveillance System for nutritional surveillance. However, results in a sample of medical students showed that the screener substantially underestimated percentage energy from fat and was only modestly correlated (r = 0.36) with multiple 24-hour recalls. In samples of men participating in intervention trials, the screener was not as precise or as sensitive as complete FFQs.

MEDFICTS (meats, eggs, dairy, fried foods, fat in baked goods, convenience foods, fats added at the table, and snacks) is a questionnaire developed to assess adherence to low-fat (≤ 30% energy from fat) diets which asks about frequency of intake and portion size of 20 individual foods, major food sources of fat and saturated fat in the U.S. diet. The initial evaluation of MEDFICTS showed high correlations with food records. In additional cross-sectional studies, the MEDFICTS underestimated percentage energy from fat; it was effective in identifying individuals with very high fat intakes, but it was not effective in identifying individuals with moderately high fat diets or correctly...
identifying those individuals consuming low-fat diets. In a longitudinal setting, positive changes in the MED-
FITCS score have been correlated with improvements in serum lipids and waist circumference among cardiac rehabilitation patients13.

A 20-item screener developed and tested in the German site of the EPIC study correlated with a complete FFQ. The validation of a 16-item percentage energy from fat screener in an older U.S. population showed correlations of 0.6 with 24-hour recalls, but variable performance in intervention studies1.

Interventions are often designed to target specific food preparation or consumption behaviors, such as trimming the fat from red meats, removing the skin from chicken, or choosing low-fat dairy products. Many questionnaires have been developed in various populations to measure these types of dietary behaviors, and many have been found to correlate with fat intake estimated from other more detailed dietary instruments or with blood lipids16.

The Eating Behaviors Questionnaire measures five dimensions of fat related behavior: avoid fat as a spread or flavoring, substitute low-fat foods, modify meats, replace high-fat foods with fruits and vegetables, and replace high-fat foods with lower-fat alternatives. An updated modified version was tested in African-American adolescent girls and correlated with multiple 24-hour dietary recalls. A subset of 30 items from the Sister Talk Food Habits Questionnaire developed for African-American women correlated with change in BMI as strongly as did the original 91 items17.

Several multifactor short instruments have been developed and evaluated, many combining fruits and vegetables with fiber or fat components. Other short questionnaires assess additional components of the diet. Prime-Screen consists of 18 FFQ items asking about the consumption of fruits and vegetables, whole and low-fat dairy products, whole grains, fish and red meat, and sources of saturated and trans fatty acids. It also includes seven supplement questions. The average correlation with nutrient estimates from a full FFQ was 0.6. The 5-Factor Screen used in the 2005 National Health Interview Survey Cancer Control Supplement assessed fruits and vegetables, fiber, added sugar, calcium, and dairy servings18.

**Brief assessment instruments for use in children**

Childhood and adolescence deserve special consideration. It is a key stage for the promotion and consolidation of food habits. Social changes, different ways of organizing family life as well as other factors are driving changes in eating habits and lifestyles in Spain as in many other countries.

Brief instruments are useful tools to identify individuals and groups who require further attention and intervention for involvement in behavior change strategies and interventions. The adapted version of the Healthy Eating Index for use among children and adolescents and the KIDMED questionnaire are examples of such tools targeted to this population group.

The USDA developed the Healthy Eating Index (HEI) with the aim of monitoring adherence to the Dietary guidelines for Americans. This index has been used in adults and children. Feskanich et al. validated and adapted version of the HEI to be used among children and adolescents (YHEI). The revised version consists of 13 components and a score ranging 0-100. Components 1 to 7 score 0-10; components 8 to 13 score a highest of 518.

YHEI components include: 1) Consumption of whole grains (2 or more servings a day score highest 10, and 0 servings / day score 0), 2) Vegetables and salads (3 or more servings score 10 points, 0 servings score 0), 3) Fruits (three or more servings score 10 points), 4) Dairy (3 or more servings score 10 points), 5) Ratio of protein foods (servings of chicken, fish, eggs, nuts, seeds and legumes, divided by the servings of beef, pork, lamb and offal, score the highest 10 for a ratio equal to or greater than 2), 6) Consumption of salty snacks, pastries and confectionery (0 per day score highest 10, and more or equal to 3 score the lowest 0), 7) Sugary drinks (same scoring that snacks), 8) Use of multivitamin supplements (Daily scores 5, never 0), 9) Margarine and butter (Never scores 5, 2 or more per day scores 0), 10) Fried foods away from home (Never scores 5, daily scores 0), 11) Visible animal fat (trim all fat scores 5, eat all fat scores 0), 12) Breakfast consumption (5 or more times a week scores 5, never scores 0) and 13) Family dinner (Daily scores 5 and never scores 0).

The KIDMED screener was designed to assess adherence to Mediterranean Diet in children and adolescents. The instrument was based on Kreateplus, a screener developed jointly by the Spanish Society of Community Nutrition and the Spanish Association of Pediatrics for use in Primary Health Care and Health Promotion settings as a tool to identify and monitor selected energy balance behaviours. The traditional pattern of DM includes a high consumption of fruits and vegetables, olive oil, fish, legumes, grains and nuts, and dairy, and promotes household food consumption. Conversely, snacks, and pastries, sweet or fast food are not characteristic elements of the DM. Therefore, KIDMED index was built from these premises. A KIDMED score below 4 is labelled low adherence to a Mediterranean Dietary Pattern. The scale highest score is 1015.

Some of these instruments have been specially developed and tested to be implemented in behaviour change interventions targeted to children and adolescents, such as Pro Children aimed to increase consumption of fruit and vegetables in European 10-12 year-old children and other intervention projects19.

In the UK and in other countries as well, a number of screeners have been developed for different purposes. Child and Diet Evaluation Tool (CADET)
is a tick-list record for all foods consumed over one 24-hour period, with a retrospective breakfast section. The instrument consist of two questionnaires, one to be completed at home by the parent or carer, and one for completion at school by a lunchtime supervisor or classroom assistant. The questionnaire was initially developed to evaluate the National School Fruit and Vegetable Scheme and was targeted to 5–7 year olds. The questionnaires assess dietary intake of 115 food items over a 24-hour period with a focus on fruit and vegetables. It includes additional questions about dietary behaviours, attitudes and socio-economic characteristics. Portion sizes are based on mean portion sizes in the National Diet and Nutrition Survey and are age and gender specific. According to the validation study, it is considered appropriate for assessing behavioural change in dietary patterns at a population level or to rank populations according to dietary intake. It is appropriate for use with children from diverse social and ethnic backgrounds across a range of settings. However, it is not considered suitable for monitoring diet-related targets in a population.

Day in the Life Questionnaire (DILQ) (7–9 years) was developed as a supervised classroom activity to measure fruit and vegetable consumption in the previous 24 hours. It is self-completion questionnaire consisting of 17 items, including pictures and words to aid recall and improve completion. The DILQ (9–11 years) is a modified version that contains 23 items. Synchronised Nutrition and Activity Programme (SNAPTM) is a web-based programme that uses a typical 24-hour recall method to assess dietary intake and physical activity in 7–15 year old children through a typical school day. It measures intake of 40 different food and nine different drink items in the previous 24 hours. It allows for the inclusion of any other food/drink not included in the list. Visual memory prompts are provided. The SNAPTM also records physical activity in the previous 24 hours. The questionnaire is likely to be suitable for the evaluation of school-based interventions.

Child Nutrition Questionnaire (CNQ) is a 14-item questionnaire to be completed by children with support from a helper. It was developed to examine dietary patterns that are known to increase the risk of weight gain in 10–12 year olds. It measures the consumption of sweetened beverages and non-core foods such as chocolate, lollies and hot dogs as well as fruit, vegetables and water. It also includes questions on the frequency of specific ‘healthy’ behaviours; attitudes towards the consumption of fruit and vegetables; and the day-to-day availability of fruit and vegetable. The CNQ was developed in Australia so it may need to be validated for use in the UK. The estimated completion time is 20 minutes.

Family Eating and Activity Habits Questionnaire (FEAHQ) is a 21-item self-administered questionnaire designed for co-completion by parents or carers and of 6–11 year-old obese children. It was developed to examine environmental factors and family behaviours associated with weight gain and weight loss in children. The FEAHQ has four separate scales based on those factors most likely to be associated with weight change including: activity level, stimulus exposure, eating related to hunger and eating style. The instrument was considered appropriate for monitoring behavioural change over time as weight loss in a child was associated with an improvement in scores. The FEAHQ was developed in Israel.

**Brief assessment instruments for use in adults**

Valid dietary assessment tools are needed to facilitate dietary counseling in high risk populations. Nutrition counseling for adults and underserved groups often occurs in clinical settings with time and resource limitations, dietary assessment tools for this setting should be brief. The Dietary Risk Assessment is one such tool, developed for non–dietetics-trained health professionals (eg. nurses and physicians) who provide dietary counseling to underserved patients. To help guide counseling, Dietary Risk Assessment response options are arranged in three columns. The left column indicates the most healthful dietary practices, whereas responses in the right or middle columns indicate less healthful practices.

A literature review conducted in 2005 identified some 71 methods. Most of them included some anthropometry and sociocultural aspects related to food behavior. Sometimes they include biomarkers or more complex anthropometrical measurements. A more standardized protocol about application procedures and advice to provide users according to the scoring. Many have not assessed the validity and reliability of the method and often not investigated the sensitivity, specificity and acceptability of these tools. In the Prevención con Dieta Mediterránea (PREDIMED) trial 14-point Mediterranean Diet Adherence Screener (MEDAS) was validated and used to identify subjects' adherence to the intervention diet, a Mediterranean dietary pattern.

Dietary Intervention in Primary Care (DINE) is a 19-item questionnaire developed for use in interview-administered. It measures an individual’s intake of total fat and dietary fibre, categorized as low, medium or high. Specific foods are included which account for 70% of the fat and fibre in a typical UK diet. The tool has been validated with good correlation with a validated four-day semi-weighed food diary. An experienced interviewer can complete it in 5–10 minutes.

Web-based tailored interventions aimed to modify food behavior, physical activity and other lifestyles in adults have also used screeners of brief instruments. Several screening tools focused on malnutrition targeted to be used in old adults have been validated, such as DETERMINE your health or MNA. These instruments will be discussed in another paper in this issue.
References


