

Dietary and exercise assessment in general practice

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Background. Diet and physical activity are important in many conditions managed in primary care. Dietary and physical activity assessment is complex, has inherent inaccuracies related to self-reporting, and is only a small part of a larger context of developing effective intervention in primary care. However, for personalized assessment in routine clinical care, and for the assessment of different intervention strategies in a general practice research setting, validated life-style assessment tools are needed.

Objective. We aimed to discuss the requirements for assessment tools and to identify feasible validated assessment instruments for use in primary care.

Method. Potential tools were identified from a *Medline search*, UK Research Intelligence, and contact with groups known to be working in the area.

Results. Several brief instruments assess mainly fat in the US diet, but the limited range of foods covered and the setting of studies limits their generalizability. Only one tool developed for UK use—'DINE', which scores total fat, fibre and unsaturated fat—was identified which is both feasible and has documented reasonable validated characteristics. Even for this tool there are doubts about the validation 'standard'. No diet or physical activity validation studies have used both subjects and health professionals from general practice settings.

Conclusion. There are very few feasible and validated dietary or physical activity assessment tools for use in clinical care or research in general practice, and doubts about the design and settings of published validation studies. Further research is needed to validate and develop a range of feasible life-style assessment tools with specified time and training requirements for use in primary care.

Keywords. Nutrition assessment, primary health care, exercises.

Introduction

The government has argued for increased health promotion¹ and rewards the Primary Health Care Team (PHCT) for collecting smoking, blood pressure, body mass index, exercise and dietary information, and giving 'appropriate' advice.² There is good evidence for the importance of diet and physical activity in the aetiology and treatment of many 'high risk' conditions managed predominantly in general practice—e.g. coronary artery disease, non-insulin dependent diabetes, hypertension, and obesity³—although there is still considerable doubt as to optimal intervention strategies in primary care.

Lifestyle assessment is likely to be an important part of developing effective intervention strategies, given the likely importance of feedback, reinforcement and individualized advice in facilitating behavioural change.^{4,5} However, dietary and physical activity assessment is fraught with difficulty. First, dietary assessment is by self-report which is likely to differ from actual behaviour for a number of reasons—belief, memory, bias, intention.^{6,7} Second, actual behaviour may be very difficult to measure, given that attempts to measure it invoke Heisenberg's Uncertainty Principle.⁶ Finally, life-style assessment is only a part of potentially effective intervention—in view of the importance of both patient and health professional experiences, perceptions, beliefs, training and time pressures.⁸ Thus perfect life-style assessment measures will never be developed—just instruments with more or less relative validity—and assessment is only a small part of a complex topic. Nevertheless, both

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for research to progress, and to provide rational monitoring and intervention for diet and physical activity in 'high risk' individuals managed in current everyday practice, we need validated assessment methods in primary care—otherwise time will be wasted giving 'inappropriate' advice.² Although dietary assessment methods have been validated in epidemiological studies^{6,7,9-11} there has been little published on the validity of dietary assessment in primary care, and little discussion of the special requirements of this setting. This is a major gap in the literature given the increasing life-style assessment and intervention in general practice—particularly by the practice nurse.¹²⁻¹⁴ There are important reasons why we cannot just rely on the existing validated instruments from other settings: (i) most validation studies are not based in primary care and do not use health professionals; the setting may well affect subjects' responses and validation characteristics; and (ii) most formal assessments require 30–45 minutes with a trained dietician or nutritionist even before data entry—very impractical time and training requirements for primary care.

This article discusses the likely requirements for dietary and exercise assessment tools in primary care—for both research and clinical purposes—and reviews what is available.

Likely requirements for assessment tools in primary care

For research

Accuracy. Paradoxically the assessment requirements for research purposes may well be less stringent than for clinical purposes, depending on the precise question being asked. A crude tool to estimate group mean (e.g. 24-hour recall) with sufficient numbers¹⁵ will differentiate between groups or 'calibrate' a more accurate tool: there is little gain from collecting more than 3–4 days information for most nutrients, and 1 day may be sufficient.⁶ However, if estimation of diet-disease relationships is needed—e.g. risk of disease following dietary exposure in a cohort study—inaccuracy and misclassification will weaken the apparent effect of exposure.¹⁶ Table 1 and Figure 1 demonstrate this well. Thus using a tool with a correlation of only 0.5 to true intake will result in 60% of subjects being correctly classified (Table 1) and an observed relative risk of 2 will reflect a real relative risk of 4 (Figure 1).

Training requirements and time. Training requirements and time again may prove less of a barrier in research than for routine practice since the extra time and money required for training and quality control can be specifically addressed in research protocols.

TABLE 1 *Relationship between correlation coefficient and misclassification of individuals*

| Correlation coefficient (of nutrient in assessment tool with true nutrient intake) | % Correctly classified (by assessment tool in thirds of the distribution) |
|--|---|
| 0.1 | 42.8 |
| 0.2 | 46.5 |
| 0.3 | 51.4 |
| 0.4 | 54.8 |
| 0.5 | 59.2 |
| 0.6 | 63.2 |
| 0.7 | 67.9 |
| 0.8 | 73.4 |
| 0.9 | 81.0 |

For clinical assessment and intervention

Validity. In US primary care individualized dietary assessment based on a Food Frequency Questionnaire (FFQ) is more likely to result in a larger change in diet and life-style than generalized information.¹⁷ If inaccurate tools are used for assessment, we will give inappropriate advice to individuals who in reality do not need advice (false positives) and not to those who do (false negatives), thus wasting clinical time and respectively generating either unnecessary anxiety or false reassurance. What level of error from tools should we tolerate before rejecting a tool for individual assessment? Clinicians can decide for themselves what tools they are happy to use, once they know the likely error, for example using the data from Table 1. We would suggest that tools which correlate with intake for any nutrient/food much less than 0.5 are likely to result in more than 40% misclassification in the correct third of the distribution, and thus be less useful.

Time. Time is a limiting factor in dietary assessment and intervention in primary care given the enormous size of the problem.^{8,18,19} Even general practitioners (GPs) who are enthusiastic about life-style intervention are unlikely to use more than a whole consultation (5–10 minutes) for dietary assessment and counselling. Since the 1990 contract practice nurses have been more involved in life-style counselling,¹²⁻¹⁴ but nurses are still unlikely to use time-consuming formal assessment (e.g. 24-hour recall). Time-efficient tools are required, including some where most time is spent by the patients themselves, with subsequent follow-up counselling by PHCT professionals.

Training requirements. Primary care team members often have had little training and a poor knowledge base to perform assessment and counselling.²⁰⁻²² Inadequate training will result in inaccurate classification, and wasteful and inappropriate counselling. Tools need to clearly define—and preferably minimize—training requirements for primary care.

Dietary assessment: what is currently available?

A *Medline* search of the world literature for dietary assessment/nutritional assessment/physical activity assessment in primary care was performed for the years 1966–1994 where both MESH terms 'primary health care' and 'nutrition assessment' were in title, abstract or keywords. Given the limitations of *Medline* searching,²³ a hand search was also made of some of the primary care journals at the RCGP library (*Family Medicine, Family Practice, Canadian Family Physician, NZ Family Physician, Australian Family Physician, Family Practice Research Journal, The Journal of Family Practice, The Scandinavian Journal of Family Practice* up to 1994). We also consulted Research Intelligence (an index of current research in primary care compiled by Bristol University), and made informal approach to the groups known to be working in this field. This strategy revealed the following dietary assessment methods that could be used for both assessment and counselling.

A number of brief assessment methods have been developed and validated in US populations, predominantly aimed as assessing fat intake, with correlations in the range of 0.4–0.6 with reference methods.^{24–29} However the narrow range of foods covered, and the setting of studies, limits the generalizability of these questionnaires.

For UK populations we identified the following tools.

- (i) Eight questions about saturated fat intake which correlate poorly with a 3-day diet record³⁰ and thus is of very limited value as an assessment and counselling tool for high-risk individuals with high saturated fat intake.
- (ii) A self-completed food frequency questionnaire³¹ showed better correlations with a 16-day dietary record, although still modest for fat intake (correlation coefficient 0.39). This tool takes 40 minutes to complete, and 15 minutes to enter the data before any education of patients can occur, has no built in output to allow counselling, and is not available currently in computerized format.
- (iii) A food frequency questionnaire has been developed by the Cardiff MRC group¹¹ which has recently been developed in a self-completed format. Unfortunately the questionnaire correlates moderately to fat and fibre intake from a weighed record (0.37 and 0.34 respectively), has not been validated in primary care, has no counselling output built into the program, and is rather expensive (£500 sterling—Tinuviel software).
- (iv) A computerized self-completed 24-hour recall has been developed and validated in a hospital setting,³² which showed 56% of assessments by

the method were within –20 to +20% of the actual intake (but no correlations were quoted, so comparison with other methods is difficult). Furthermore, no counselling output has been built into the program and it is not available commercially.

- (v) Numerous other computerized packages for dietary assessment have been recently reviewed.^{33,34} Unfortunately most of these packages are for completion and interpretation by researchers or dietitians, have not been validated in the primary care setting, and are too expensive and time consuming for most PHCTs to consider using.
- (vi) The Dietary Instrument for Nutritional Evaluation (DINE) tool³⁵ has been developed by the ICRF group in Oxford to allow an initial assessment of diet by the practice nurse. This tool, which takes 10–15 minutes to administer, gives a fibre and fat score and assesses the type of fat consumed, has been validated against a 4-day food diary. It allows reasonable classification of subjects into high, medium and low fibre and fat groups (gross misclassification 6% for fat and 5% for fibre, correlation 0.51 for fat, 0.46 for fibre, and 0.43 for P/S ratio). The disadvantage of the DINE tool is that it only assesses two components of diet, has not been validated against an accepted relative standard (at least 7 days of weighed record), and there was no biochemical validation or assessment of those individuals who under-reported during the 4-day validation diary. The tool, however, is user friendly, reasonably accurate, and provides immediate feedback for individual counselling without requiring computer facilities.

A major limitation of all these published validation studies, is that only one³¹ was carried out in primary care, and none used practice nurses to administer or collect data—although the DINE study (see above) did use occupational health nurses based at a car manufacturer. The difference in health professional and setting may limit the generalizability of all these studies, since both may affect responses to questionnaires.

Informal approach to other groups working in the area has revealed two tools designed for use in the primary care setting which some PHCT members are already using, neither of which have validation data available yet:

- (vii) The Post Graduate Nutrition Centre (PGNC, Rowett Institute, Aberdeen) have produced pilot tools for dietary assessment and counselling. Provisional versions of these tools have a scoring system for fat, alcohol and sugar (high score = healthy diet, low score = unhealthy diet). They are very quick to use and provide immediate feedback.

(viii) The Health Education Authority booklet and questionnaire 'Changing what you eat'. This encloses a modified food frequency questionnaire asking what people eat in a normal day. It is quick to use and breaks food down into food groups (fruit and vegetables, fat, meat and meat alternatives, dairy products, cereals). It allows immediate counselling based on the pattern of an average day, but has the disadvantage of limited assessment of the whole diet. It is also unclear whether patients understand the portions concepts used by this tool.

Alternatively some of the more conventional assessment tools could be used in general practice.^{6,7,9,10} The best relative standard the weighed record is clearly too cumbersome to be used routinely. However a 24 hour recall is used by some, with the advantage of immediacy, and disadvantages of a limited assessment of the normal diet, and hence limited ability to classify individuals correctly in the distribution.⁶ Numerous FFQs exist which have the advantage of assessing foods more rarely eaten, and are likely to classify more subjects correctly although still with relatively low correlations to weighed records.⁶ FFQs and 24-hour recall have the disadvantage of requiring considerable time (and also computer facilities in the case of FFQs). A food diary may be more accurate since it relies less on recall, but would have the disadvantage of needing planning (the patients would have to complete the diary before the appointment with the nurse) and once again probably computer facilities. One of the few UK comparative studies of different methods of assessing intake compared to a (16-day) weighed record has been performed in 163 women as part of validation for the EPIC study.¹⁰ This study has demonstrated that the correlations for an FFQ, unstructured 24-hour recall and 7-day food diary with the weighed record were 0.53, 0.43 and 0.6, respectively, for energy, 0.55, 0.41, 0.6, respectively, for fat, 0.33, 0.62, and 0.74, respectively, for fibre, and 0.50, 0.48, and 0.60 mean for all 15 nutrients/food components quoted (except alcohol), demonstrating a modest but consistent superiority of a food diary method to either an FFQ or 24-hour recall for most nutrient groups.

Physical activity assessment: what is available in primary care?

As with diet, although physical activity questionnaires have been used for research,³⁶⁻⁴¹ there is little published regarding the validity of such questionnaires, particularly in a primary care setting. 'Better Living Better Life', which was based on expert consensus,⁴² suggests asking: (i) how many times during the past 4 weeks have you taken any sort of physical activity at all

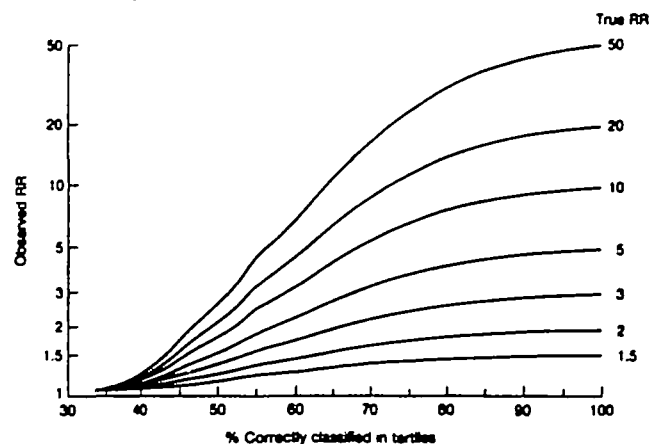


FIGURE 1 Relationship between % correctly classified in thirds of the distribution and observed/true relative risks (RR); reproduced with permission from the Authors and OUP

(including walking) that lasted 20 minutes or more? (ii) which of these involved continuous movement involving the whole body (like walking, swimming, dancing, cycling)? and (iii) which of these activities were vigorous enough to make you breathe hard or sweat?

It is unclear if the assumptions in the above questions are valid—requirements of 20 minutes, breathlessness, the 4-week period, the last 4 weeks rather than an 'average' 4 weeks, etc. More work is needed to establish the validity of such questions in a primary care setting. Given that fitness may be more important than reported physical activity as a better predictor of subsequent mortality,⁴³ we also need simple methods of assessing fitness in the primary care, for example step/walking tests used in other settings.⁴⁴⁻⁴⁶ Recent evidence suggests it is not clear that we should be just asking our patients about vigorous physical activity, since there does not seem to be a threshold for benefit and the most sedentary patients are likely to gain from moderate physical activity:⁴⁷ validated questionnaires which assess walking or other moderate activities are also needed.

Conclusion

Diet and physical activity are important in many conditions managed in primary care. Dietary and physical activity assessment is complex, has inherent inaccuracies related to self-reporting, and is only a small part of a larger context of developing effective intervention in primary care. However, for personalized assessment of diet or physical activity in routine clinical care, and for the assessment of different intervention strategies in a general practice research setting, validated life-style assessment tools are needed. From a review of the literature, research intelligence, and contact with groups known to be working in the area, there are very few

feasible and validated life-style assessment tools for use in clinical care or research in general practice. Thus further research is needed to validate and develop a range of feasible life-style assessment tools with specified time and training requirements for use in primary care.

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