

# Evaluating Dietary Quality in Diet Counselling: Progress Update

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## Abstract

Increased research on effectiveness and efficiency of lifestyle programs to manage cardiometabolic risk conditions has identified a need for brief diet assessment tools to evaluate initial diet at baseline and to compare counselling results among client groups over time and across programs. In particular, diet quality (DQ) indices, such as versions of the Healthy Eating Index (HEI) are useful where the focus of treatment is to modify foods or the whole eating pattern. They have advantages in that population data are available for comparison, they focus on those aspects of eating patterns that together are associated with reduced health risk, and they generate a summary score. Current limitations are that a nutrient analysis must also be available to assess sodium, fat, sugar and total caloric intake, thus feasibility in clinical practice remains an issue. This mini-review examines progress in development of brief diet assessment and DQ tools in dietary counselling or lifestyle education programs for individuals with cardiometabolic risk conditions. To improve comparability among published studies, it is recommended that researchers and program evaluators consider using HEI or other current DQ tools relevant to their target population in addition to traditional diet assessment methods. New work is needed to further adapt current DQ tools for validity and feasibility of completion in both clinical counselling and population surveillance contexts.

**Keywords:** Healthy Eating Index, HEI, cardiometabolic risk, obesity, diet quality, intervention, metabolic syndrome, program evaluation

## Introduction (1570 words)

Diet assessment is a core activity in traditional clinical nutrition care/diet counselling process at baseline and in follow-up [1]. An initial diet assessment, along with information from lifestyle, medical, anthropometric and laboratory assessments guides selection and delivery of the required nutrient/food intervention. Diet assessment is also important for evaluation of outcomes achieved with each client, in local program evaluation and in implementation research. Measurement error and other limitations of current diet assessment methods are well-recognized and longstanding challenges in dietetics [2]; increased research on ehealth or digital interventions, genetic studies in nutrient metabolism, and population epidemiological studies hold hope for development of more accurate and valid approaches. In our opinion, among the most promising approaches to emerge to date is the use of diet quality (DQ) indices, such as the Healthy Eating Index (HEI), especially in treatment of cardiometabolic risk (CMR) conditions.

CMR conditions and diseases are a major and growing health burden in many countries, as obesity continues to increase worldwide [3]. Excess body weight is associated with heterogenous metabolic effects and cardiovascular disease (CVD) remains a prominent clinical disease. Adverse metabolic effects of excess body weight become more prominent in middle age and are variously defined in health systems as specific conditions, such as prediabetes, type 2 diabetes, or hypertension, or risk scores such as the Framingham 10-year risk score. Metabolic syndrome is characterized by three or more indicators including higher waist circumference, higher blood pressure, dyslipidemia characterized by low high-density lipoprotein and elevated triglyceride levels, and elevated glucose levels [4]. The various terms describe overlapping populations [5]. Fortunately, significant progress has been made in demonstrating the benefits of personalized lifestyle counselling in large clinical and

community trials [6], and several countries (UK, US, Japan) have undertaken large projects to start to address prediabetes and/or CMR.

Lifestyle programs have a poor record of effectiveness in practice, an issue dubbed the efficacy-effectiveness gap [6]. Implementation studies are needed. Key challenges for planners and researchers include: 1. measurement challenges in assessing diet in typical community and healthcare settings, 2. measurement issues in identifying the key aspects of the intervention processes, and 3. linking process indicators of diet change to key changes in clinical measures at the individual level. This mini-review is directed to implementation researchers and program evaluators involved in developing and evaluating dietary counselling/lifestyle/health education programs in individuals with CMR conditions.

To improve effectiveness and efficiency, diet assessment tools are needed that will address the main foods to be altered, increased or decreased, with scoring sufficiently sensitive to document typical food intake changes seen in the target groups. Feasible tools are needed that can be completed in a relatively short time during a client encounter or self-reported online and will characterize an individual's diet at baseline relative to their peers and the population. Tools that can be summarized as a score would be helpful in comparing results among client groups, over time and across programs, especially in CMR conditions where multiple aspects of diet are the focus of care. Wider use of a few key tools could lead to important advances. DQ tools are one possible option, as an adjunct to other types of diet assessment. While many dietitians have used a variety of such tools in practice, no such tools are widely used in clinical dietetics research.

## Literature Review

### **Past Developments of Diet Screening and Assessment Tools**

Past development of brief DQ tools has a surprisingly long history as reviewed by Kant in 1996 [7]. More recently, researchers have developed several screening tools like REAP or "Start the Conversation" for use by physicians or nurses. Three recent reviews examine these and other recently developed tools [8-10]. Gil et al provide a useful definition of DQ tools as, "algorithms aiming to evaluate the overall diet and categorize individuals according to the extent to which their eating behaviour is "healthy" [9]. Kant noted that "Approaches used for measuring overall diet quality include those based on examination of the intake of nutrients, food groups, or a combination of both" [7].

### **Diet Quality Assessment in Epidemiologic Studies**

Progress in linking DQ measures to morbidity and mortality outcomes gained traction with several studies in the 1990s relating DQ to CVD outcomes. Wirt and Collins suggested in their review in 2009 review that such tools might be adaptable to the clinical context [11]. We became interested in the potential use of an epidemiologically developed DQ tool in our clinical counselling work as we wanted to gain insight on overall DQ compared to our country's population-based data and to other large studies, particularly the PREDIMED study in Spain [9]. These indices most often evaluate a combination of several key nutrients and/or foods and compile them into an overall summary score. They can be calculated from food frequency questionnaires, recalls or food records [12]. Several DQ tools are known to be associated with reduced risk for CVD and overall mortality [13], but no one tool is currently preferred for associations with CVD risk [14], and strengths and limitations must be kept in mind [15]. Of note, are the many assumptions and decisions made in the creation of each tool. While work is underway to create DQ indices for children, global diet, etc. for

population health surveillance purposes, consideration of these DQ tools is beyond the scope of this brief review.

Among the DQ tools developed to date, the various healthy eating index (HEI) tools were of particular interest, as they have had extensive development, some key foods aligned with our counselling care map [16] and population data were available for comparison [17], including data suggesting improved DQ in the US over time, especially related to “empty calories”[18]. Diet adequacy and moderation components were scored based on intakes of servings of foods and required an estimate of overall energy intake for the calculation of percentage of energy from total and saturated fat. More recent versions of the HEI are calculated on a per 1000 kcal basis. We recently completed a systematic review of the use of various versions of the HEI in CMR diet counselling studies [19]. The supplement to this review shows scoring of different version of the HEI.

## Discussion

Based on our experience to date, where we completed several 24-hour recalls, in addition to a Canadian version of the 1995 HEI and the Mediterranean diet assessment (MEDAS) tool from the PREDIMED study [9], we have formulated the following recommendations for further use and development of DQ tools in clinical counselling evaluations and studies, in the short and longer term.

In the short term, it is highly recommended that researchers and program evaluators consider using one or more of the available DQ tools for which there are current DQ data available for the target population, in addition to traditional diet assessment methods. Use of a Canadian adaptation of the HEI allowed us to compare our patients’ diets with population averages, as a check on possible subject selection bias. We were also able to detect change in some food groups, especially among patients with an initial HEI score in the lowest third of initial score [20]. Patients with HEI scores in the upper third at baseline did not change their overall score after 12 months. The validity of the changes were confirmed against 24-hour recall nutrient analysis (Lim, MSc thesis) [21]. These results suggest that the DQ assessment could be used as a screening tool to identify patients who would most benefit from personalized diet counselling.

MEDAS results were compared to the PREDIMED study results [9]. The baseline and follow-up diet scores of our subjects were not comparable to PREDIMED subjects, reinforcing the observation of diverse eating patterns of different countries, even among people attempting to change diet. This food serving-based DQ was very useful, however, as it was possible to detect which foods were most amenable to change. For example, use of olive oil did not change among our subjects, while it was possible to increase nut consumption[20].

Other advantages were more direct estimation of food group intakes, in units that were familiar to both dietitians and patients, which helped focus the counselling. The food frequency questionnaire we created to calculate both the HEI and MEDAS was well understood by dietitians and clients and took about 10 minutes to complete.

In the longer term, more development and validation studies are needed to adapt current DQ tools for the clinical context and to develop consensus on tools that might be used across both in clinical counselling and population surveillance, as envisioned by early researchers. Greater consensus among clinical nutrition implementation researchers would be a great intermediate step to begin to use DQ

tools to compare results across different intervention approaches – digital vs. in-person vs. groups, balanced plate concepts vs. provided meals or supplements, etc.

## Conclusion

Advances in DQ assessment show promise for improving the effectiveness and efficiency of diet counselling in practice and in program evaluation. Use of DQ tools may be particularly useful to professionals treating people for CMR or other conditions where there is a whole diet focus; or where the intent is to modify multiple foods or a whole eating pattern. Greater use of a DQ tools in conjunction with other tools used for nutrient analysis or other goals may improve comparability among published studies now and in the future. While further methodological development and adaptation of these tools is needed before widespread adoption, there is good potential to improve the evidence base for the effectiveness and efficiency of diet counselling in CMR and other diet related conditions.

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## Conflict of Interest

No conflict of interest to declare.

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