

On the need for improved methodologic quality of published reviews

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Adopting a Mediterranean-style diet has garnered a great deal of scientific and public interest based, at least in part, on claims that it may help to prevent chronic disease, particularly when compared with a so-called Western dietary pattern or lifestyle. Mediterranean diets may be defined in variable ways, although they are commonly characterized by a high consumption of vegetables, fruit, grains, legumes, fish, and eggs, along with a moderate intake of meat, oil, and wine (1). It may have originated in ancient civilizations, but scientifically, the Mediterranean diet has been the focal point of much research over the past 20 y (2). Indeed, a large volume of studies have been published that have evaluated potential associations between Mediterranean-style diets and chronic disease, and as a result, many reviews on this topic have been published. Whether these reviews are high-quality assessments of the evidence is an open question. In this issue of the *Journal*, Huedo-Medina et al. (3) conducted a review of the methodologic quality of meta-analyses and systematic reviews on the Mediterranean diet and cardiovascular disease outcomes.

The authors evaluated quality using the AMSTAR method, which stands for A Measurement Tool to Assess Systematic Reviews (4). AMSTAR has been shown to be a valid and reliable measurement tool for the assessment of the methodologic quality of systematic reviews (5). In brief, the AMSTAR tool contains 11 items, which were modified slightly by Huedo-Medina et al.. AMSTAR can be used to assess whether the following components were reported: 1) study design including the study population characteristics, 2) the literature search protocol including the ability to replicate the identification of relevant articles, 3) the coding of studies in terms of individual study quality, and 4) the analysis and interpretation of reviews including meta-analysis methodology. Overall, the authors found that the body of review literature on Mediterranean diets and cardiovascular disease outcomes did not satisfy fully the methodologic quality standards of the modified AMSTAR instrument. The average score was only 31.2% of 11 AMSTAR elements (i.e., ~3.4 of 11 items). Reviews assessed to be of higher methodologic quality were more likely to be published in journals with higher impact factors. This may be expected, given that it is likely that higher quality journals may place more emphasis on rigorous methodology standards by requiring prospective authors to use quality tools, including others such as the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) statement when submitting a manuscript for publication.

On the basis of a review of Huedo-Medina et al.'s evaluation, reviews of the scientific evidence pertaining to the relation between the Mediterranean diet and cardiovascular disease are not particularly informative, although the authors themselves did not review the underlying evidence. That is the bottom line here and an unfortunate one. Put another way, we need reviews of higher methodologic quality to advance the science of diet and chronic disease, and we need analytic studies with better methodologic characteristics to build the foundation for the reviews. In line with these conclusions, the purpose of this brief commentary is to highlight the challenges of both conducting systematic reviews (which include quantitative meta-analyses) and performing "reviews of reviews."

The scientific community has been discussing the need for a systematic approach to reviewing the scientific and medical literature since the mid-1980s (6). For detailed discussions of the method and examples of its application, see references 4 and 6–21. With this background in mind, we suggest that some key questions need to be remembered.

FIRST, WHAT QUESTION IS THE REVIEW DESIGNED TO ADDRESS?

Reviews can answer questions about disease causation, about public health (and medical) practice recommendations, or about what research remains to be done; the latter is a common feature of academic research grant applications. Each purpose is legitimate and each requires somewhat different components. Nevertheless, we believe any evidence-based review should be systematic—that is, any evidence-based review should at least meet the majority of considerations/criteria found in tools such as AMSTAR. That said, efforts to review the scientific evidence in the absence of a systematic approach remain reasonable, although these should be considered authority-based commentaries (i.e., personal judgments) rather than evidence-based (systematic) reviews (22).

SECOND, WHAT IS THE QUALITY OF THE STUDIES INCORPORATED INTO THE NARRATIVE REVIEW OR META-ANALYSIS?

AMSTAR includes only 1 question on quality of studies. It asks if the authors of the review included a "formal quality assessment

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of the included studies.” The precise way in which quality was assessed is another matter altogether. Sanderson et al. (23) showed that there are 86 tools for assessing the quality of epidemiologic studies, including susceptibility to bias. According to Sanderson et al., key features of these many tools for assessing the quality of epidemiologic studies include the following: methods for selecting study participants, methods for measuring exposure and outcome variables, design-specific sources of bias, methods for control of confounding, statistical methods, and a conflict of interest statement. Simply put, beyond assessing the quality of the review, assessing the quality of the individual studies is both important and complex.

THIRD, ARE THE QUALITY CONSIDERATIONS FOR NARRATIVE REVIEWS DIFFERENT FROM THOSE FOR META-ANALYSES?

The answer to this question may seem obvious. Despite the ability of AMSTAR to assess some basic qualities of reviews and meta-analyses, there are unique features of each. For a list of issues to be incorporated into meta-analyses, see Stroup et al. (24). For example, the rationale for studies included and excluded in analytic models should be reported in a transparent fashion such that analyses can be replicated. Also, the method for model selection should be documented, and the summary estimate results should be presented with heterogeneity statistics.

In sum, we applaud Huedo-Medina et al.’s efforts to evaluate the quality of reviews on the Mediterranean diet and chronic disease. Similar efforts may serve to encourage authors to improve their approach to reviews. Finally, we remind the reader that the best tools for scientific review reporting and validity may be available (and probably need to be enhanced); however, the impetus is largely on the shoulders of the authors, peer reviewers, and editors to implement and use the tools appropriately and in their full capacity. There may be a basic blueprint for all researchers to follow when performing reviews of the literature but as the saying goes, “a great hammer doesn’t make a great carpenter; but a great carpenter will always want to have a great hammer” (25).

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