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An Evidence-Based Approach to Reviewing the Science on Nutrition and Health

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It seems that every day a new research study on nutrition and health makes the headlines. Nutrition and health professionals are faced with the challenge and responsibility of making sense of the emerging and sometimes conflicting science. At what point should their educational programs and messages change? These issues can be addressed by using an evidence-based approach (EBA) to review the science. In medicine, an EBA is often used to appraise research findings to provide the best clinical care to patients (Coomarasamy et al., 2001; Briss et al., 2000). Today, EBA is becoming an accepted way to develop guidelines for nutrition and health promotion. EBA offers a framework for integrating the best current research into education and communication programs (Myers, 2003).

What Is an Evidence-Based Approach?

Simply put, an EBA is the process of systematically reviewing, summarizing, and assessing the quality of the published research in a specific topic area. The entire process is documented, transparent, and reproducible (U.S. Department of Health and Human Services, 2002). Another professional addressing the same research question using the same method should be able to replicate the analysis and arrive at the same answer.

Common Aspects of Systematic Reviews

The increasing use of an EBA has led to the development of a variety of systems. Several prominent organizations have authored criteria for using an EBA, including the *Cochrane Collaboration*, the *U.S. Preventive Services Task Force*, and the *American Dietetic Association*. Although these organizations' methods have subtle differences, each has common basic tenets.

Steps of an Evidence-Based Systematic Review (Myers, 2003; Briss et al., 2000)

- Define an appropriate problem or area of uncertainty
- Formulate the problem as a question
- Set criteria for identifying relevant, quality evidence
- Search for and find the published body of evidence
- Sort to identify the relevant evidence

- Abstract the findings and evaluate the individual reports
- Summarize the body of evidence and form recommendations or make decisions
- Specify the strength of the evidence supporting the recommendation/decision
- Disseminate findings to appropriate stakeholders

Why Is an Evidence-Based Approach Useful?

An EBA minimizes bias because the literature search, article selection, and review are comprehensive, documented, and reproducible. Many nonsystematic reviews are based on a biased selection of scientific articles for review, resulting in conclusions that are not balanced. An EBA includes classifying the scientific articles into grades of evidence, based on study quality and design. The collective body of evidence is then summarized to answer the specific question and determine the strength of the evidence.

Generally speaking, the higher an individual study's methodology is ranked, the more robust and objective the results are thought to be. Collectively, a systematic review of randomized controlled trials (RCT) is considered the highest level of evidence for evaluating treatment. Although reviews of RCTs provide the best information to judge the weight and quality of evidence, there have not been many RCTs of dietary interventions for the general public. Therefore, systematic reviews on nutrition and health are not limited to RCTs only, but may also include other types of studies (Concato, 2004; Myers, 2003). The study design hierarchy follows.

Study Design Hierarchy in Evidence-Based Systematic Reviews (Listed From Highest to Lowest Quality)

Randomized Controlled Trial
Nonrandomized Trial
Cohort or Case-Control Study
Cross-Sectional Study
Case Series or Time Series
Opinions of Respected Authority

Depending on the depth and breadth of published research on the topic of interest, using an EBA may identify a lack of available information, resulting in the inability to answer a question and make a recommendation. Contributing factors may include poor quality of information, outcomes that are difficult to measure, or emerging science that is still in the early stages of research and testing. In such cases, using an EBA would identify important data gaps.

Getting Started: Formulating the Question

The most crucial step in conducting an EBA is formulating the research question. Formulating a well-constructed question is the key to finding a precise and relevant answer. Questions that are too broad or too specific may not yield useful results. In the medical field, researchable questions usually contain four elements, known as the **PICO** format:

- **Population** or primary problem—What are the most important characteristics of the population?
- **Intervention**, exposure, or procedure—What was the population exposed to?
- **Comparison** of alternatives (one may be a placebo)—How do interventions and outcomes compare? There may not always be a specific comparison of two distinct interventions but simply a comparison of the outcome with and without the intervention.
- **Outcome**—What are you trying to measure, improve, or affect? In public health, this may be the specific disease risk that is affected, the function that is improved, or other health parameters that are measured.

The following example presents the key components for a researchable question in the **PICO** format:

PICO Component	Example
Population/Problem	Adults in the United States
Intervention/Exposure	Whole grain
Comparison, if any	Consumption (highest vs. lowest quintiles)
Outcome	Cardiovascular disease risk

A sample question incorporating these components might be: ***Is cardiovascular disease risk associated with whole grain consumption?*** Researching this general question might result in a “yes” or “no” answer, which could be used to make a general statement about a health benefit associated with whole

grain consumption. It would not support specific guidance as to how much whole grain is recommended for a particular level of benefit. A more specific question might be: ***In healthy adults, what amount of whole grain intake is associated with the lowest risk of cardiovascular disease?*** This question adds the target population, as well as a measurable exposure and outcome (whole grain consumption amounts associated with a specific degree of disease risk). The resulting research and analysis should be sufficient to address the general question, as well as the strength of the evidence for recommending a specific amount of whole grain consumption to reduce cardiovascular disease risk in healthy adults.

Summary

An EBA can help nutrition and health professionals identify the strength of the evidence related to a specific health behavior, intervention, or treatment. It can help them know when to incorporate new nutritional education messages into their programs and materials. A systematic review is an important process that must be integrated into the development of public health recommendations, such as the Dietary Guidelines for Americans, which are intended to promote health and reduce risk of chronic disease.

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