Sifting through Nutritional Science:
Separating Hype From Scientific Research

BACKGROUND

Your clients are besieged on a daily basis with health information from a variety of sources—the Internet, newsgroups, blogs, the media, as well as friends and family. Information is often piecemeal, taken out of context, or not based in sound science—and often contradicts other "authorities." People are increasingly making decisions based on anecdotes and testimonials rather than credible science, which ultimately may be detrimental to their health.

In this era of information overload, distrust of large institutions and use of non-traditional modes to acquire information, the health professional needs to re-evaluate his or her role as information provider. The good news is that, while clients are collecting information from a variety of sources, they still largely respect and seek information from health professionals.

More than ever before, health professionals have a duty to educate and empower their clients to utilize critical-thinking skills as they collect and synthesize information. This monograph will assist you in sifting through the volumes of information and separating the hype from scientific research so that you can better help your clients do the same. Fostering critical-thinking skills will help your clients make appropriate decisions when faced with conflicting information from a variety of sources ... a skill that will guide them in their quest for optimal health, vitality and well-being for years to come.

Research definitions

In order to evaluate the credibility of research, an understanding of standard research definitions and different types of study designs is critical. The most commonly used terms are reviewed below.

- **Blind experiment**—an experiment in which subjects do not know what treatment they are getting. This is important in avoiding the common "placebo effect"—the expectation on the part of the subject that the treatment is going to be effective.
- **Double-blind experiment**—an experiment in which neither subjects nor researchers know which group is receiving treatment. This is a stronger design than a blind experiment, as it avoids introduction of potential bias in the experimenters.
- **Control group**—the group who gets the same treatment as the experimental group except for the variable being tested. Including a control group is critical in any study so that the effect of treatment can be fairly attributed to the treatment itself and not to any other (uncontrolled) variable.
- **Experimental group**—the group who gets the real treatment being studied.
- Placebo—a sham treatment to test the psychological effect of getting a treatment. This could be a control drink or diet containing everything except the intervention factor, or any other treatment simulating the treatment *sans* the factor under investigation.
- **Peer-reviewed manuscript**—a research paper that is reviewed and approved by other experts in the field before it is published. This is critical to the credibility of the study, as the process often involves re-writing or editing to strengthen the discussion and conclusions drawn, ensuring the final publication is of high quality.

Types of research designs

Knowing what type of research design was used in a study is another way to assess its credibility and whether its conclusions are appropriate. The basic types of research designs are described below:

- **Case studies** are studies of individuals in clinical settings, where researchers can observe treatments and their apparent effects.
- **Case-control studies** are those in which untreated subjects matched in many variables (age, weight, ethnicity, activity level, etc.) are compared simultaneously with the intervention subjects in order to evaluate the effect of treatment.
- **Cross-sectional studies** are those in which exposures and outcomes are observed simultaneously in a population at only one point in time. Cross-sectional studies do not allow researchers to infer cause and effect; rather, they are a way to identify possible causes of disease and stimulate further research.
- **Epidemiological studies** are the studies of populations, often used in nutrition to search for correlations between dietary habits and disease incidence. These studies are observational in nature, do not prove cause-and-effect, and are considered a first step in seeking nutrition-related causes of disease.
- **Laboratory studies** are those that are performed under tightly controlled conditions and are designed to pinpoint causes and effects. Laboratory studies often use animals to shorten the time that it takes to observe results, to reduce cost, and to avoid ethical issues involved with treatment in humans.
- **Randomized clinical trials** are studies in which subjects are randomly assigned to an experimental or control group and protocols are tightly implemented by the researchers. These studies are generally considered the "gold standard" of nutrition research, as they are implemented to identify specific causes of disease. Often, this is the last step in confirming an effect of treatment in humans after other types of studies have consistently shown an association.
- **A meta-analysis**, although not a study *per se*, is a statistical and systematic review of the scientific literature that uses quantitative methods to merge the results of valid studies. Because meta-analyses often involve synthesis of a number of different studies among various population groups, encompassing a variety of confounding variables and utilizing different study types and designs, conclusions drawn from a meta-analysis may indicate a strong case for the treatment in question.

How to evaluate sources of information

Many factors need to be considered in evaluating a study or area of research. Questions to ask and areas to consider are outlined in **Figure 1**.

Clients may often ask your advice about a study found on the Internet or an article from the popular press. To help them better evaluate what they are reading and hearing, give them a copy of the consumer handout "**Health and Nutrition Research: How to Separate Fact From Fiction**," which outlines questions they can consider.

One example of how hype rather than credible science can be misleading is the current concern around high-fructose corn syrup (HFCS) in our diets. HFCS is converted from corn syrup to taste like sugar, with a composition nearly identical to table sugar (sucrose). HFCS has become the predominant sweetener used in food and beverages since its introduction in 1981. The incidence of obesity has also escalated during this time, leading some scientists and consumers to conclude that there is a relationship between consumption of HFCS and the rise in obesity. Indeed, a number of observational studies show an *association* between these two phenomena, but no study—including randomized clinical trials—has shown that eating or drinking HFCS causes obesity. Additionally:

- Studies show that HFCS does not affect our appetite or feelings of hunger more than sucrose, nor does it cause us to overeat.
- HFCS does not change the composition of our meals or have a greater impact on body fat or diabetes than table sugar.
- The incidence of obesity has risen during this timeframe in a number of other countries that do *not* use HFCS in their food supply—and thus HFCS consumption cannot be definitively linked to obesity.

The determination to find a culprit to the obesity problem has caused many people to blame HFCS and overlook the lack of scientific justification. In fact, the obesity dilemma stymies researchers because there may not be a single culprit, but a host of lifestyle factors that add up to a significant public health problem.

Other 'hot' nutrition topics—such as *trans* fats and sodium—also warrant close evaluation of the research before drawing conclusions and making decisions that will impact our population. Discussion around these issues can become highly contentious and emotional and it does not benefit anyone—the consumer, the policy maker or the food industry—to make rash decisions based on incomplete or preliminary information.

Media and nutrition research: Do they mix?

While the popular media is a powerful channel through which to disseminate information in a timely fashion and to a large body of the population, care needs to be exerted when gleaning information from these sources.

- Results are often published in the media and in layperson journals based on the results of a single study, which may or may not agree with previous studies conducted. Placing the study in context of previous studies allows the reader to evaluate the whole body of research and prevents hasty conclusions from being drawn.
- It is tempting to extrapolate findings to people, when in fact a study may have been conducted in animals or even in cell cultures. Similarly, a study conducted in a particular gender, ethnic or age group cannot necessarily be applied to other population groups.
- Reporters often do not have knowledge or expertise in the topic and have a tendency to oversimplify the results.
- Researchers occasionally "leak" findings prematurely to the media before the study is complete, in order to raise interest, claim credit for the research or be "first man out the door" with the (albeit preliminary) results.
- Finally, media often sensationalize findings, making the headline or tagline more interesting in order to sell more copies or increase readership.

Practical application for the health professional

The health professional has an important role to play in the responsible dissemination of accurate and pertinent nutrition information to clients and patients. In order to do so, you can:

- Stay up-to-date with the latest nutrition research.
- Work with the media to put findings into context with previous research, painting a complete picture for the reader.
- Help clients develop and utilize critical-thinking skills by assessing the credibility of the science, examining study design and identifying the source of the information, authority and motivation of the author(s). Encourage clients to consult with a dietitian or appropriate health professional for further information and before making decisions that could impact their health.
- For health professionals involved in public policy, evaluate the complete body of research on a topic before drawing conclusions and forming policy or making dietary decisions that impact a large number of people.
- Rather than focusing on isolated components in foods and omitting foods with 'offending' components from our diets, it is important to assess the nutritional benefits of the whole food and how it fits in to the overall diet. At the same time, we need to avoid the propagation of 'fortified junk foods' (such as *trans*-fat-free cookies and fortified sodas and doughnuts) that comply with specific nutrient requirements but do not constitute a healthy food choice.
- Show how even foods that are considered 'treats' or 'extras' can fit into an overall healthy diet. Help your client make appropriate choices by identifying nutrient-dense foods, such as a slice of cheese on a sandwich, an avocado on a salad, or an oatmeal-raisin cookie for dessert. Do not perpetuate the "good foods/bad foods" myth.

Credible nutrition resources

American Dietetic Association ..... www.eatright.org
International Food Information Council..... www.ific.org
USDA's Center for Nutrition Policy and Promotion ..... www.cnpp.usda.gov
Food and Nutrition Information Center (FNIC)..... www.nutrition.gov
FDA's Center for Food Safety and Applied Nutrition..... www.cfsan.fda.gov
Dairy Council of California ..... www.dairycouncilofca.org
USDA Food Guide System ..... www.mypyramid.gov
National Dairy Council..... www.nationaldairycouncil.org

Figure 1: Questions the health professional can ask when evaluating research

1. What type of study was it?
   a. Prospective or retrospective? *Prospective studies tend to be more tightly controlled.*
   b. Animal or human? *Results from animal studies may or may not be appropriate to extrapolate to humans.*
   c. Observational or intervention? *Intervention studies are more tightly controlled; observational studies can have a multitude of confounding variables that could impact the results.*

2. What were the characteristics of the subjects in the study?
   a. Consider age of subjects, ethnicity, gender, geographic location and whether it is appropriate to apply these study findings to your clients.
   b. How many subjects were studied? *In general, the more subjects studied, the more representative the sample and the results are stronger.*

3. What is the weight of the scientific evidence?
   a. Has the topic been studied for a number of years, with replication and validation of the results?
   b. Does the evidence include many different types of studies?
   c. Is the mechanism for any effect identified and understood?
   d. Does it support, or conflict with, previous research?
   e. Is there consensus among the scientific community?

4. Who sponsored/funded the research?
   a. Was it industry-funded? *Research results are often unfairly discounted if the funding agency has a vested interest in the results. However, if a study is subjected to the same rigorous review as research funded from "impartial" agencies, the funding source should not play a role in the credibility of the findings*

5. Where was the study published?
   a. Was it published in a peer-reviewed, scientific journal?
   b. Is the author(s) well respected?
   c. What are their credentials?
   d. What types of references do they quote?