Of calcium, iron and fat

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Abstract
Human nutrition provides a vehicle for examining the role of science in students’ everyday lives. This paper summarises the publicly available nutrition information about the nutrients, iron, calcium and fat. Much of this publicly available information is acceptable to the nutrition community, but some is not. Students can collect this kind of information for themselves, and reflect on the role of science in the information they locate. This provides a powerful way to link science to the everyday world of students.

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What is the role of science in our everyday lives? Students can tackle this question by considering human nutrition. There is a clear scientific dimension to human nutrition, but of course there are many other dimensions: social, cultural, aesthetic, and so on. Indeed, some of these other dimensions may be regarded by those outside the nutrition and health communities as more important in our everyday lives than the scientific dimension.

Students’ conceptions of human nutrition

Francis and Hill (1993) noted that Year 4 and Year 8 students appear to develop concepts such as ‘good for you’ and ‘healthy’ in relation to food and nutrition based on a variety of information sources. These concepts “seem only marginally affected by school” (p. 82). A group of preservice primary teacher education students and parents of the school students were also included in the study. The authors noted that the language used by the Year 8 and University students did seem, on the surface, to be more technical than that used by Year 4 and parents … However, there was little evidence that their fundamental knowledge … was very different. (p. 82)

The U.K. study (Turner, 1997) involved teachers interviewing five- to twelve-year old children. The data suggest that even five-year-old children have some understanding of the relationship between food and health. However, as in the Australian study, children had their own conceptions about the functions of food and specific
nutrients. Turner concluded:

Teachers have an important role to play in ensuring that children appreciate that it is the amount of particular foods eaten that is important for health, rather than the exclusion of particular food items. (p. 505)

The Spanish study (Nunez & Banet. 1997) involved students aged between 11 years and 17 years. The authors reported, as in the two previous studies, that students had their own concepts about human nutrition. Some of these student concepts the authors labelled “wrong” or “incomplete”, but they noted that the concepts displayed a “certain logical coherence.” Finally, they noted that students’ conceptions differ from scientific knowledge … in most of the levels of education analysed… we can only conclude that regular teaching does not help students to effectively restructure their knowledge of human nutrition. (p. 519)

The purpose of the study reported here is to identify widely available information about nutrition: information that students could access if they wished. This process of searching actively for themselves for data on human nutrition should help students, with the help of their teachers, to restructure their knowledge of human nutrition.

Given the size of the nutrition field, we focused on the roles of three particular nutrients, calcium, fat and iron. Fat is an important nutrient commonly associated with the appearance of the ‘gut’: obesity is regarded as a serious health problem by health professionals, and it affects some 40 per cent of Australians. It has led to a ‘gut buster’ campaign in some parts of Australia. The 1991 National Health and Medical Research Council (NH&MRC) adult dietary guideline (NH&MRC. 1991) on fat (general guideline 3) is: “Eat a diet low in fat and, in particular, low in saturated fat.” Lester (1994) noted: “Total fat intake may promote the development of hypertension … There is also an association between total fat intake and some forms of cancer.” (p. 217)

Iron is an important mineral commonly associated with blood. An adequate supply of iron in the diet is especially important for particular groups. The 1991 NH&MRC adult dietary guideline on iron (specific guideline 2) is: “Eat foods containing iron. This applies particularly to girls, women, vegetarians and athletes.” Lester (1994) noted: “Over 70 per cent of women aged 25-55 years from the 1983 National Dietary Survey had iron intakes below the RDI” (p. 201).

The 1991 NH&MRC adult dietary guideline on calcium (specific guideline 1) is: “Eat foods containing calcium. This is particularly important for girls and women.” Lester (1994) noted: “Calcium is of concern … because of the association of dietary calcium intakes in young women and later (post-menopausal) susceptibility to osteoporosis.” (p. 181)

The information provided here gives students the opportunity to consider the kind of information provided to ordinary people. Those who are not nutrition professionals, and how science can contribute to making judgements about this information.

Publicly available information

The following set of questions about each of the three nutrients, iron, calcium and fat, guided us in our search. These questions, in our view, identified the major categories of publicly available information.

1. What does science say?
2. What do nutrition professionals say?
3. What do industry nutrition pamphlets say?
4. What does advertising say?
5. What does television say?
6. What do magazines/newspaper say?
7. What does ‘alternative medicine’ say?
8. What does the World Wide Web say?

Our selection of information in each category is summarised from the sources specified below.

1. What does science say?

We summarised information on each nutrient from: (1) encyclopedias (Collier’s Encyclopedia, 1993; World Book Encyclopedia, 1995) and, (2) scientific texts available in public libraries. Relevant texts included Food Facts (Briggs & Wahlqvist, 1988) and Staying Healthy with Nutrition (Elson & Hass, 1992). The science in these sources provides an overview of factual information on nutrition, including the function, structure, and classification of the particular nutrient. Information on the role of the nutrient in health is provided as well as a brief coverage of the need for the nutrient. ‘Science’, not surprisingly, provides a general overview of nutrients rather than providing more specific information an individual could apply.

2. What do nutrition professionals say?

We summarised information based on selected publicly available nutrition information pamphlets and nutrition sheets. These were developed and produced by recognised community nutrition health services such as the Health Department of Western Australia, National Heart Foundation and hospital dietetic departments.

Unlike ‘science’, the information provided by nutrition professionals includes how to achieve specific nutrient needs in addition to why we need them. The information acts as a mediator between scientific information and information that nutrition professionals judge is suitable for adults. It attempts to transform scientific information into practical information that can be incorporated into people’s daily nutrition practices. For example, information on specific food items, food labelling, cooking methods and sample menu plans are provided. The information is tailored to the intended audience. Most of the information covers: (a) the reason one needs to make the suggested nutritional change, if a change is required; (b) the result of not making the change; (c) overview of the nutrient; (d) dietary sources
of the nutrient; (e) how much each person needs; and, (f) how to choose/prepare foods.

3. What do industry nutrition pamphlets say?

The data in this category were based on publicly available nutrition pamphlets, sponsored by food companies, that provide information about one or more of the three nutrients. These were considered to be representative of currently available information in this category.

These materials are usually written in conjunction with nutrition professionals and so the information tends to be very similar to category 2 above. In most cases, the industry pamphlets use the nutrition information to highlight the need for their particular product and so the information provided may not be as complete as non-industry influenced nutrition information. For example, a dairy company provides information on the need to lower saturated fat intake without specifying that dairy products are a source of saturated fat. Another food company focuses on their reduced fat products rather than food products as a whole. A company that produces fats and oils states in its pamphlets that one should "concentrate on reducing the invisible fat in the diet more than visible fat"; nutrition professionals, on the other hand, consider the reduction of both visible and invisible fat to be equally important.

4. What does advertising say?

The information in this category was based on nutrition information on each nutrient in advertisements in magazines, newspapers, product packaging, mail distribution and television. Again, we chose representative material rather than trying to be exhaustive. See also the next section which focuses on non-advertising information provided by television.

Advertising often uses nutritional health claims to sell the product. This category tended to provide incomplete or conflicting nutrition information, and so is not a reliable source of information as it tends to provide an incomplete picture of human nutrition needs. Nevertheless, advertising provides a widely available source of nutrition information and functions to increase public awareness of nutrition. Some of the problematic aspects of nutrition information in advertising are as follows.

(a) Information based on unsubstantiated claims: for example, a fibre product claims to block fat absorption and cholesterol production; a retail diet book claims that "raw fruit and vegetables carry a lot of toxins and fat."

(b) Out of context information: for example, an iron supplement advertisement highlights its value by stating that only 10% of our Recommended Dietary Intake (RDI) is actually retained and the rest gets 'wasted'. However, it fails to inform the reader that the RDI is specifically designed to account for varying iron absorption from different foods.

(c) Misleading information: for example, a fibre supplement advertises its function as a means to lower cholesterol without considering other important lifestyle factors.

5. What does television say?

We collected nutrition information on each of the three nutrients provided on television programs and advertisements. Three hours of adult peak time television (6-9 p.m.) were recorded over seven consecutive days for each of Channels 7, 9 and 10 in Perth. The main messages from television advertisements was incorporated into the previous category. Our analysis of this brief period of television revealed little nutrition information was telecast; this finding is consistent with Radimer and Hill (1996):

Only a very small amount of time in these television shows was devoted to nutrition, and people who do not view evening lifestyle shows receive minimal nutrition information during their television viewing. (p. 121)

6. What do magazines/newspapers say?

We examined nutrition information on each nutrient in the following magazines for the period September, 1995 to September, 1996: Australian Women’s Weekly: Time; Bulletin; and, Choice. As Choice is a consumer magazine the period of analysis was extended to encompass the period 1990-1996. Our choice was based on the accessibility to the magazines. According to B&T Magazine (August 1996, p. 15), the circulation figure for the first three of these magazines on June 30, 1995 was, respectively: Australian Women’s Weekly (895,667), ranked 1; Time (107,210), ranked 18; Bulletin (97,776), ranked 22. No circulation figure was available for Choice.

In addition, we collected information on each nutrient provided in the newspapers. We analysed the West Australian and the Sunday Times in the period of August 26, 1996 to October 26, 1996.

Like category 1, science, this category tends to act as a mediator between researchers and ordinary people. However, unlike the information provided by nutrition professionals, magazines and newspapers tend to report the latest development and theories which are usually too specific to be useful to most adults. For example the main message from a newspaper article is as follows: “Bile acid enables the body to absorb saturated fats and clear cholesterol. Bile acid secretion is faster in obese people and it is not related just to what they are eating.” Although the nutrition information provided by newspapers and magazines is not usually as complete as that provided by nutrition professionals, the information still tends to be consistent with current nutritional knowledge.

7. What does ‘alternative’ medicine say?

The information in this category was summarised from information provided by: widely available alternative nutrition books; health food shops; alternative health
organisations; and naturopaths. Health organisations and naturopaths advertised in the ‘yellow pages’ were contacted and asked for information on each of the three nutrients. Unfortunately, the response was poor. Many companies stated that they preferred to provide ‘holistic’ nutrition information rather than specific nutrient information.

The information provided on each of the nutrients in this category is similar to that provided by science and nutrition professionals. However, some methods for achieving nutritional recommendations differ from those which would be regarded as ‘correct’ by nutrition professionals. For example: a newsletter produced by a company which distribute ‘natural medicines’ states “Vitamin C is the only thing that will control Lp(a), a ‘really bad’ cholesterol. Three grams of vitamin C should be taken every day plus other antioxidants.” Nutrition research states that the recommended dietary intake is 30–40 mg and that many possible adverse health effects of continued excessive ingestion of ascorbic acid have been reported (Truswell, 1990).

8. What does the World Wide Web say?

This category proved too large to analyse, given the time available. This source requires a separate effort on its own.

Discussion

The nutrition information we have identified typifies the kinds of information available to students, and appears to fall into three groups. Clearly, our information is not exhaustive, but rather representative of the information an interested student is likely to access.

The first group is nutrition information which is consistent with nutrition professionals’ understanding: that is, the information is nutritionally ‘correct’. Information in categories 1 (science) and 2 (nutrition professionals) falls into this group. However, information in categories 3 (industrial nutrition pamphlets) and 6 (magazines and newspapers) is sometimes incomplete and may, as a consequence, be misleading. For example, nutrition industry pamphlets may provide ‘correct’ information, but this may not be complete, as we noted above. Magazines may accentuate the unusual or atypical, even though Radimer (1996) and Cardwell (1996) have suggested women’s magazines, in particular, provide nutritionally ‘correct’ information. These same magazines, of course, can provide subtle and contradictory messages when they depict ‘super slim’ models throughout their pages.

The second group of information is incomplete or simply misleading. Advertising is the main culprit here. Even when the information is nutritionally correct itself, it may be misleading because of the lack of context. Lank et al. (1992) have made similar observations in the USA:

Generally the nutrition messages conveyed in these commercials supported current dietary recommendations.

![Figure 1. Summary of claims about calcium, iron and fish oils as outlined by Hendler (1990, pp. 151-247)](image)

Iron

Positive
1. Prevents and cures iron-deficiency anaemia
2. Anti-carcinogenic
3. Stimulates immunity
4. Boosts physical performance
5. Prevents learning disorders in children

Negative
1. Promotes oxidation
2. Depresses immunity
3. Toxic after prolonged use
4. Destroys vitamin E

Calcium

Positive
1. Beneficial in prevention and treatment of osteoporosis (‘brittle bones’)
2. Prevents cancer
3. Useful in the treatment of high blood pressure
4. Lowers cholesterol and helps prevent cardiovascular disease
5. Helps alleviate cramps in the legs
6. Useful in treating and preventing arthritis
7. Helps keep the skin healthy

Negative
1. Forms kidney stones
2. Causes tissue calcification
3. Produces magnesium deficiency and the premenstrual syndrome in women

Fat (fish oils)

Positive
1. Protects against cardiovascular disease
2. Protects against hypertension
3. Useful in the treatment of arthritis and other inflammatory disorders
4. Helpful in the treatment of psoriasis and other skin problems
5. Helps prevent/treat cancer
6. Therapeutic in kidney disease

Negative
1. Toxic
2. Harmful in diabetics
3. Can cause vitamin deficiencies

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but the way in which the food products were promoted was often inconsistent and confusing, particularly in the area of fat. (p. 337)

Ostbye et al. (1993) similarly wrote of the Canadian experience:

While no individual food is nutritionally “bad”, the combination of foods which make up a diet can vary widely in nutritional quality. The “diet” advertised on “prime time” does not appear to promote the kind of healthier food choices which many people would like to see and which have been recommended nationally. (p. 375)

The third group includes category 7 (alternative medicine) and category 8 (World Wide Web). The information provided by these two sources is diverse and requires a separate study. Nevertheless, it is clear that some of the information provided in these two sources would be regarded by nutrition professionals as incorrect. Given the evidence suggesting (a) the greater interest in alternative medicine, and (b) the increasing availability of the World Wide Web, both these sources deserve greater attention.

Finally

How do ordinary people, those who are not nutrition professionals, make sense of this information? How does a science background help us “decode” the information? Is expert information contradictory or unusable in our ordinary lives? Part of the difficulty is that new findings are reported which are generally incomplete or conflict with current knowledge. How can the Working Scientifically curriculum strand help here? Students will enjoy attempting to answer these questions.

Finally, a “snapshot” of claims about these three nutrients is provided in Figure 1. This should provide a useful starting point for students’ searches.

References


