Fish Consumption Health Advisories: Who Heeds the Advice?

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Abstract

Various objectives exist for fish consumption health advisory programs. Two primary objectives are (1) enabling potential fish consumers to make their own, informed decision about whether or not to eat fish; and (2) reducing public health risks by reducing human exposure to chemical contaminants via fish consumption. Achieving either of these outcomes requires that potential consumers of sport-fish are aware of and understand the health advice provided. Several studies that focused on human understanding of and response to health advisories in the Great Lakes Basin are summarized. Key findings indicate (1) advisory experts may not understand the specific information needs of their audiences; (2) advisory awareness and knowledge vary among target populations, emphasizing the need for communication strategies specific to each target audience; and (3) achieving advisory understanding will not guarantee compliance with advisory recommendations.

Introduction

Fish consumption health advisories have been issued by each of the Great Lakes States for almost 20 years. Advisories were developed in response to concerns about potential negative human health consequences from consuming fish, caught recreationally (or for subsistence purposes), affected by chemical contaminants in the Great Lakes. This article reviews key concepts and findings related to human attitudes and behaviors associated with fish consumption health advisories.

Health Advisory Objectives

Advisories are a risk management tool designed to inform fish consumers about how to minimize exposure to chemical contaminants. Alternative risk management tools include closure of contaminated fisheries, or bans on the possession of fish affected by contaminants. Such a tool was implemented for the New York portion of Lake Ontario in the mid-1970’s, when the New York State Department of Environmental Conservation banned the possession of seven species of highly-valued sport-fish. The ban was greeted by a public outcry (Brown 1976), which emphasized the importance of involving the affected public in risk management strategies to protect human health.

Implementing an advisory that can adequately protect human health is a challenging and complex task. On one hand, advisories are voluntary. Advisories are intended to enable people to make their own, informed decision about fish consumption, and thus their likely exposure to chemical contaminants through eating fish (Knuth 1990). On the other hand, advisories are created with the intent of reducing public health risks. Achieving this outcome requires that consumers of contaminated sport-fish receive, understand, and comply with the recommendations in the advisory (Knuth 1990).

Several government agencies may be involved in the development and dissemination of an advisory, even within one state. Each agency may put greater emphasis on one of the two outcomes noted above, or may emphasize different outcomes altogether.

In the Great Lakes States, policy objectives to be achieved via fish consumption health advisories have varied among health, fishery management, and environmental quality agencies, each of whom is involved in some aspect of the health advisory process (Knuth and Connelly 1991; Knuth 1994). Health agencies have emphasized reducing public health risks; enabling people to make their own, informed decision about eating Great Lakes fish; helping people select a variety of risk-reducing behaviors that may include fish cleaning and cooking procedures, fishing for less-contaminated species, and fishing in less-contaminated locations; and informing people about the health benefits of eating fish. Fishery management agencies have also emphasized these objectives, in addition to encouraging public support for toxic cleanup programs; and encour-
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Disseminating health advisories to achieve human health protection objectives is a form of risk communication. Risk communication is an interactive process of information exchange among individuals and groups and institutions, a process that involves multiple messages about the nature of risks (National Research Council 1989). These multiple messages may received and processed by those audiences who are targeted in the advisory communication program. Advisory communicators must understand their target audiences to ensure that they are meeting their needs, and not just the needs perceived by the communicators (Slovic et al. 1981).

Through a series of studies focused on target audience characteristics, attitudes toward advisories, and behaviors in response to advisories, we developed a conceptual model of the social-psychological process influencing response to advisories (Figure 1) (Connelly et al. 1992; Knuth et al. 1993; Velicer and Knuth 1994). The model suggests several factors must be considered in communication programs that seek to influence either people’s understanding of advisories or adoption of the recommendations contained within. External variables include the characteristics of the audience itself that influence which health advisory information sources will be used, and how information may be interpreted in an individual or societal context. A variety of beliefs influence how advisory information will be processed, including beliefs about the source of the information, the importance of fish and fishing, and the probable reactions of other people who are important to that individual. Ultimately, health advisories target behavior, including general fish-eating habits, and fish-catching practices. The extent to which these behaviors must change to comply with advisory recommendations, are critical factors influencing response to advisories.

Can Experts Design Effective Advisories?

Health advisories are developed, written, and disseminated by a variety of individuals with training in public health, toxicology, fisheries management, and sometimes risk communication. How well can the collective efforts of these experts address the in information needs of the audiences they are trying to reach?

To address this question, we focused on three target audiences in seven New York State counties bordering Lake Ontario (Jefferson, Monroe, Niagara, Oswego, Cayuga, Wayne, and Orleans), and experts charged with developing and communicating health advisories. Audiences included (1) opinion leaders among recreational anglers and charter boat operators; (2) migrant farm workers; and (3) low-income individuals (Velicer and Knuth 1994). Methods involved a combination of in-person individual and group interviews, and mail survey techniques.

In this study, experts and target audiences differed in their assessments of important information to include in an advisory. Opinion leaders among angling and charter boat associations differed from experts in placing greater importance on information about changes in health advisory recommendations over time and the reasons for those changes, risk-reducing fish cleaning methods, comparisons of fish consumption risks with other dietary risks, and details about fish sampling methods. Experts however, placed lower importance on including these types of information within a health advisory. Low-income individuals tended to receive their information from mass media sources. Advisory experts often felt they had little influence over the content of mass media coverage regarding advisories. Migrant farm workers had little access to mass media or the government documents describing the advisory. Rather, farm workers required interpersonal advisory dissemination mechanisms, and information communicated in a language (e.g., dialect, difficulty) they could understand. Such interpersonal advisory communication programs were quite limited in number at the time of this study.

What Determines Response to Advisories?

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Figure 1. Conceptual diagram of the socio-psychological process determining response to fish consumption health advisories (based on Knuth et al., 1993)
Messages delivered in the preferred communication style of the target audience have a greater chance of success than those constructed to meet the communication styles preferred by the communicator (Johnson and Petcovic 1987). Our findings, however, indicate that the target audiences differed from advisory experts regarding preferred communication styles and desired information (Velicer and Knuth 1994).

**Who Do Advisories Reach? Who Do They Miss?**

Health advisory target audiences include any potential fish consumer who may eat fish from waters covered by an advisory. We have conducted a series of studies addressing the extent to which various target audiences have been aware of and/or knowledgeable about advisories, and have adopted behaviors adhering to health advisory recommendations. These studies have focused on low-income individuals and migrant farm workers (Velicer and Knuth 1994), licensed anglers in New York State (Connelly et al. 1992, 1993), and licensed anglers throughout the Great Lakes Basin (Connelly and Knuth 1993). Most have used the mail survey research techniques.

Awareness of Great Lakes health advisories among these audiences ranged from 9% among migrant farm workers who were interviewed (Velicer and Knuth 1994) to almost 95% among licensed angler respondents who fished Lake Michigan (Connelly and Knuth 1993). Typically, 75% to 85% of licensed angler respondent groups have been aware of advisories. Awareness of advisories has differed however based on location fished, age of respondent, years of education, income, gender, and ethnicity. In general, awareness has been lower among those fishing smaller bodies of water (e.g. St. Mary’s River, Niagara River) vs. the larger lakes; younger groups vs. older; less-educated vs. more-educated; lower vs. higher income; women vs. men; and nonwhites vs. whites.

Specific knowledge about health advisories and health effects associated with fish consumption has been more variable than awareness. Accurate knowledge of specific advisory recommendations among those claiming to be aware of advisories has ranged from about 25% to 55% of respondents indicating the correct information. Among New York licensed angler respondents, about 53% could correctly identify the recommended maximum number of fish meals for women of childbearing age and children under 15, and about 26% could correctly identify the recommended maximum number of fish meals any individual should eat from any New York State water (Connelly et al. 1992, 1993). Other low-knowledge areas included the negative health effects associated with eating contaminated fish, and the time-frame over which negative health effects would be exhibited. In general, knowledge scores tended to increase with increasing age, income, and education, and men generally had higher knowledge scores than did women.

Behavioral compliance with advisory recommendations, based on reported fish consumption patterns, has varied from about 45% to 80% of various populations keeping their fish consumption within levels recommended in health advisories. About 34% of migrant farm workers interviewed lived with women and children who ate sport-caught fish recommended against consumption in the advisory (Velicer and Knuth 1994). Throughout the Great Lakes Basin, about 25% of licensed angler respondents ate fish that advisories recommended should not be consumed (Connelly and Knuth 1993). About 54% of licensed New York Lake Ontario anglers of childbearing age (men and women ages 18-40) ate fish above levels recommended in the advisory.

In New York State, 20% of licensed anglers statewide exceeded the advisory recommendations (Connelly et al. 1992). This group, however, tended to be as knowledgeable about the advisory as other fish consumers, but more likely than others to (1) believe that the health risks associated with fish consumption are minor compared to other risks, (2) believe the health benefits are greater than the risks, and (3) have adopted risk-reducing fish cleaning and cooking methods.

**Implications and Conclusions**

Until recent years, most advisory communication strategies in the Great Lakes States were based on disseminating information via (1) fishing regulations guides; (2) specially prepared government brochures available by request; and (3) simplified information in general media releases. Recently however, Great Lakes States are placing greater efforts on implementing communication strategies targeted toward specific groups.

These include brochures targeted toward women of childbearing age.
that are distributed at health care clinics (e.g., Michigan, Minnesota), tip sheets specific to individual bodies of water and local populations (e.g., Minnesota, New York), multilingual posters and brochures distributed to ethnic audiences known to be frequent fish consumers (e.g., Minnesota, Wisconsin), and individual personal outreach at fishing access sites (e.g., New York). With the implementation of these more specific communication strategies, it is likely that advisory awareness and knowledge will increase among those low-awareness, low-knowledge groups noted above.

Even if advisory awareness and knowledge increase, however, it is uncertain what effects will be evident in fishing and fish-eating behaviors. These behaviors are affected by a host of factors (see Figure 1), only some of which are under any influence by agencies communicating health advisory information.

If successful health advisory programs are judged by individuals’ abilities to make their own, informed decisions, perhaps these renewed efforts to reach out to specific target audiences who have specific information needs will be sufficient. These specifically-targeted efforts are, at the very least, necessary to achieve the objective of informed decisions by all potential fish consuming populations.

If, however, successful health advisory programs are judged by percent compliance with the fish consumption recommendations contained within advisories, agencies will need to understand better the link between awareness/knowledge and ultimate behavior. Results from the New York statewide study (Connelly et al. 1992) indicate advisory awareness and knowledge by themselves do not predict compliance with advisory recommendations.

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