

A qualitative study of fish consumption during pregnancy^{1–3}

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ABSTRACT

Background: Many pregnant women in the United States do not consume enough docosahexaenoic acid (DHA)—an essential nutrient found in fish. Apparently conflicting findings that fish consumption is beneficial for the developing fetus, yet potentially toxic because of mercury contamination, have created uncertainty about the appropriate fish-consumption advice to provide to pregnant women.

Objective: Our objective was to determine knowledge, behaviors, and received advice regarding fish consumption among pregnant women who are infrequent consumers of fish.

Design: In 2009–2010 we conducted 5 focus groups with 22 pregnant women from the Boston area who ate <2 fish servings/wk. We analyzed transcripts by using immersion-crystallization.

Results: Many women knew that fish might contain mercury, a neurotoxin, and had received advice to limit fish intake. Fewer women knew that fish contains DHA or what the function of DHA is. None of the women had received advice to eat fish, and most had not received information about which fish types contain more DHA or less mercury. Because of advice to limit fish intake, as well as a lack of information about which fish types they should be eating, many of the women said that they would rather avoid fish than possibly harm themselves or their infants. The participants thought that a physician's advice to eat fish and a readily available reference regarding which fish are safe to consume during pregnancy would likely have encouraged them to eat more fish.

Conclusion: Pregnant women might be willing to eat more fish if this were advised by their obstetricians or if they had an accessible reference regarding which types are safe. *Am J Clin Nutr* 2010; 92:1234–40.

INTRODUCTION

Fish and other seafood are healthful foods that are the primary dietary source for elongated omega-3 (n–3) polyunsaturated fatty acids (PUFAs) (1). Adequate intake of elongated omega-3 PUFAs during pregnancy, particularly docosahexaenoic acid (DHA), is essential for optimal fetal neurodevelopment and may also protect against other adverse perinatal and longer-term outcomes (2). In the past few years, expert panels have released consensus guidelines for DHA intake during pregnancy (2). Only about one-quarter of pregnant women in the United States are eating the amount of DHA recommended for optimal maternal and child health (1).

However, fish may also be contaminated with methylmercury, a demonstrated neurotoxin to which the fetal brain is particularly sensitive (3). Overall, ≈10% of women of childbearing age in the United States have higher than recommended mercury concentrations (4). The US Food and Drug Administration and

Environmental Protection Agency have issued warnings recommending that pregnant women limit their fish consumption to avoid excess mercury exposure (5, 6). Pregnant women consumed less fish after these guidelines were disseminated (7).

These apparently conflicting findings—that fish consumption is healthy for the developing fetus yet simultaneously potentially toxic—have created considerable uncertainty as to the appropriate fish consumption advice to provide pregnant women. Classically, simple public health messages, such as “Don't smoke” are the most effective. However, in this circumstance a nuanced approach may be indicated, because women should both avoid fish likely to be high in mercury and seek out fish that is low in mercury and high in DHA.

Qualitative research is an important first step to developing an effective public health message (8). Little work has been done to understand what pregnant women know about the risks and benefits of fish consumption during pregnancy, from where they get their information to what underlies their fish-consumption habits, especially among women who are infrequent fish consumers. We conducted a series of focus groups to better understand pregnant women's knowledge of the health effects of fish consumption during pregnancy, to learn what fish consumption advice they had received and from where, to determine whether and for what reasons they made any changes in fish consumption once becoming pregnant, and to understand barriers and facilitators to fish intake.

SUBJECTS AND METHODS

Study design and population

From November 2009 to March 2010, we conducted 5 focus groups with a total of 22 participants. We recruited women by

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² Supported by grant R01 ES016314, Pilot Project funding from the HSPH-NIEHS Center for Environmental Health (P01 ES000002), and the Harvard Pilgrim Health Care Institute.

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Received July 2, 2010. Accepted for publication August 19, 2010.

First published online September 15, 2010; doi: 10.3945/ajcn.2010.30070.

using postings displayed at Boston-area obstetrics clinics, advertisements in a local newspaper, in online classified advertisements, and at a local parenting listserv. The posting identified the project as a study of “diet during pregnancy,” but did not mention fish. We provided a phone number and e-mail address for interested women to contact us.

The research assistant interviewed responders via telephone to determine eligibility and to collect demographic information. To be eligible for participation, a woman had to be ≥ 18 y of age and currently pregnant. Because we were interested in targeting women with low fish and DHA intakes, we included only women who reported consuming fish < 2 times/wk but who had no contraindications to fish consumption such as allergy or self-restrictions, such as vegetarian diet. So that potential participants were not aware of the study’s particular focus on fish, the screening instrument also included questions on other components of diet, including intake of fruit and vegetables, nuts, and meat. Of the 47 interested women, 11 eligible women were unable to attend our scheduled group meeting times, and we excluded another 14 ineligible women (9 who consumed fish ≥ 2 times/wk and 5 who would not consume fish at all). The Harvard Pilgrim Health Care Human Subjects Committee reviewed and approved all study protocols. All participants provided written informed consent.

Structure of focus groups

We developed the moderator’s script based on the goals of ascertaining what pregnant women knew about the benefits and risks of fish consumption, from where they had heard advice regarding fish consumption, what their fish consumption behaviors were, and whether they had changed their intake of fish during pregnancy. Study co-investigators and a convenience sample of local pregnant women reviewed the focus group script to ensure that it was clear and addressed all target topics. An experienced focus group moderator who was not a study investigator led the group discussions. Before the first group, the moderator provided feedback and suggested edits to the script. After each focus group, the study investigators met together with the moderator to further refine the script for clarity.

To allow a discussion of general diet before focusing on fish, the moderator began the focus groups with discussion topics regarding what participants had heard about healthy pregnancy dietary choices and about which foods should be avoided or encouraged. The moderator then shifted the discussion to focus on fish: what participants had heard regarding the health effects of eating fish, mercury, and omega-3 fatty acids. Participants were asked from what sources they had heard information about fish consumption during pregnancy and whether and how their fish consumption had changed since they became pregnant. We were particularly interested in understanding factors influencing the amount and types of fish consumed, such as cost, availability, knowledge of how to cook or prepare fish, and whether pregnancy cravings or nausea impeded or increased their consumption of fish during pregnancy. Sample questions appear in **Table 1**. Throughout the sessions, the moderator encouraged participants to speak until all views were expressed and often probed for further clarification. The moderator did not attempt to reach group consensus on any topics and did not attempt to quantitatively determine the number of responses to each question.

TABLE 1

Discussion topics addressed in focus groups and sample questions from the moderator’s script

Topics	Sample questions from moderator script
Knowledge	Have you heard of any types of fish that might be safer or healthier to eat during pregnancy? Why are these fish types likely to be healthy? Have you heard of any types of fish that might be less safe or healthy to eat during pregnancy? Why are these fish types less healthy?
Advice	What have you heard about the health effects of eating fish? Where did you hear this information? Is this a source you trust?
Behaviors	Before you became pregnant, what types of fish did you eat? How often? How have you changed how often you eat fish since becoming pregnant? How have you changed the types of fish that you eat since becoming pregnant?
Facilitators and barriers	What are some factors that influence how much or which types of fish you eat now?

We held all focus groups in the evening, and provided dinner. The discussions lasted 1.5–2 h, including 0.5 h for dinner. At the end of each focus group discussion, we gave each participant a pamphlet that details the current US Food and Drug Administration guidelines for fish consumption during pregnancy (9). We also gave a \$25 gift card to all participants.

Data collection

We audio-recorded the group discussions, and the research assistant—who had been trained in note-taking—took detailed notes regarding the tone of the conversation, such as laughter. The research assistant then transcribed the focus group discussions using her notes and the audiotapes.

Analysis

After we completed the focus groups, we held a series of meetings during which we developed and then refined a series of general themes encompassing all of the group discussions. Two investigators (EO and AB) assigned each participant comment to one or more themes. After the 2 investigators independently coded the transcript from one focus group, we reconvened as a group to assess our level of concordance regarding which comment belonged to which themes. We discussed and then came to consensus about any comments for which we had assigned divergent themes. Once we felt confident that we shared an understanding of what each theme was meant to capture, we assigned these themes to the comments contained in the remaining 4 focus group transcripts. For the few comments on which we could not reach consensus, another investigator (JH) provided the final assignment.

Once we had assigned one or more themes to each comment, we analyzed the transcripts by using the immersion-crystallization approach (10). This approach involves prolonged immersion into the text, which allows for an intuitive crystallization of emerging themes. From repeated readings of the data, we developed

subthemes within our 5 predefined general themes and identified additional themes that we had not classified a priori.

RESULTS

Of the 22 participants, 13 were white, 5 were black, 2 were Hispanic, and 2 were of other race-ethnicities. Ten participants were pregnant for the first time, and 18 participants had completed at least some college. At recruitment, the mean gestational duration was 21 wk, and the participants ranged in age from 19 to 35 y.

We identified 7 major themes in our analysis (Table 2). The 5 predetermined themes were the participants' knowledge of the health effects of fish, advice they had received, fish intake behaviors, and barriers and facilitators to fish intake. The 2 emergent themes were the women's emotions regarding fish intake and diet philosophies that influenced fish intake. We summarized these themes and the subthemes within them and provide representative quotes in the sections below and in Table 2.

Knowledge

The women's knowledge generally fell into 3 subthemes: the health effects of fish and its components (mercury, omega-3 fatty acids/DHA), which fish types were more or less healthful and why, and the amounts and types of fish they believed they could safely eat during pregnancy. Many (10 of 22) women mentioned that fish can contain mercury. Most (16 of 22) had a sense that mercury is "dangerous" and "can affect neurological development." Some did not feel that they had in-depth knowledge of its effects: "I think it's just supposed to be toxic. That's about as far as I got with it." Three women mentioned a possible connection between mercury exposure and autism. A few also mentioned bacteria, parasites, or contaminants from the canning process as reasons to avoid fish. None mentioned polychlorinated biphenyls as a contaminant associated with fish.

In discussions about which fish types are less healthful, 8 of the women identified swordfish as being on the "forbidden list." With few exceptions, most could not name any of the other 3 types that the US Federal Mercury Advisory has recommended that pregnant women should avoid, although none mentioned those fish as types they would eat. Others knew that mackerel, bluefish, and fish that are larger, "high on the food chain," "deep sea fish," or "predatory" were more likely to contain mercury. When asked which fish are higher in mercury, some women named types that do not tend to contain high levels of mercury, including catfish, shrimp, shellfish, "fattier fish," and "bottom feeders."

Several women identified tuna as a fish that they generally ate or liked to eat, but were confused about which type of tuna they could eat: "There's like chunk light, and all the different kinds. I forget which one you're supposed to eat and which ones you're not." Shellfish was another source of confusion. During the groups several women questioned: "what's the deal with shellfish, you guys?" or "and I can never remember about shellfish—is it you're supposed to eat it, or you're not?" Other women's viewpoints ranged from "we're not supposed to eat shellfish," to "really? Not shellfish? I thought it was okay as long as they were cooked."

Many women "couldn't remember" what omega-3 fatty acids and DHA do, although some mothers (8 of 22) recalled that they are supposed to have a "positive health effect." A subset of these women (5 of 22) knew that DHA is "supposed to help with brain

functioning," and a few mentioned other potential health benefits including "your cholesterol" and "good for your eyes. Good for . . . just everything." One woman commented that she "didn't know DHA is an omega-3 fatty acid."

Several women identified salmon as a fish that is generally safe and high in omega-3 fatty acids. Other types that women identified as safe or healthful fish to eat during pregnancy included trout, tilapia, herring, red snapper, scallops, lobster, sardines, and fish that are "fattier," "smaller" or "lighter, flakier." However, many of the women couldn't identify by name any fish that are safe to eat during pregnancy, and, of the others, most had a hard time naming more than one or a few healthful fish types: "I know that there are more, but I couldn't give you a list."

Many of the women could not identify a particular frequency of fish consumption that they should be or were targeting. If the women did report a specific guideline for safe fish intake during pregnancy, most commonly they thought it was once a week. One mentioned "5 oz a week of fish that could have mercury in it." Several mentioned a limit for intake of tuna fish in particular: in some cases one serving per week, whereas others believed they could not eat any tuna.

Advice

Some of the women had received some information from their obstetrician or midwife regarding which types of fish to avoid during pregnancy, usually in the form of a handout. However, most did not have any conversation about fish intake with their obstetric provider, and some felt that they did not receive an adequate explanation about why they should be avoiding these types: "It's a lot of topics which are mostly restrictions than explanations why—you know that you don't have to do, but you don't really know why."

Most women followed their physician's advice to limit fish intake: "You know, my doctor doesn't recommend it, so don't question it." However, several reported that they had "negotiated" how much fish they could consume: "I'll have like a tuna sub once a month—that's what my doctor and I negotiated." Another recalled "I went to the Bahamas a couple months ago. And it's, like, a big grouper fishing area and that would have been what I was eating probably 2 or 3 times when I was there. But I negotiated one piece of grouper."

In addition, very few of the women were told which types of fish they could eat: "I haven't heard which are the healthier fish to eat. I've heard which are the ones to avoid, but not to eat." None received advice during their pregnancy that they should try to eat fish, but they might have followed such advice: "If they told me it was recommended that you eat fish 3 times a month, I would do it. If they're sure about what they're saying and, like, the studies have shown that it was ok, I would do it."

Beyond fish, many of the women had no discussions with their obstetric care providers about diet: "My doctor leaves me with an impression that actually the food, it's not so important because . . . they never ask me anything about what I eat, how I eat . . . they ask me about the vitamins, about the baby, everything else but not about my eating." However, women would find such discussions to be helpful: "Yeah, my doctor doesn't really push diet too much. Which, right now it's making me wonder why aren't we talking more about it? Because it would be good information to receive."

Most of the women did not pay much heed to advice that they received from friends or acquaintances: "everybody has their

TABLE 2

Summary of results from the analysis of 5 focus groups with 22 pregnant women from the Boston area¹

Themes	Major subthemes	Representative comments from focus group participants
1. Knowledge	Fish contain mercury—a toxin that is harmful to the brain.	“Developmental delays...um, just something you want to steer away from.”
	Fish contain DHA and omega-3 fatty acids. These are healthful, but many women did not know why.	“Omega 3 fatty acids. I don’t know what they do, but I know they’re supposed to be good for us.”
	Fish consumption once a week, or less often, is recommended for pregnancy.	“I heard once a week somewhere. And I don’t know if it was in a handout that my midwife gave me, or if it was in a book, but I definitely have heard the once a week thing somewhere.”
	Women do not know much about which fish types are healthful to eat.	“I think really just more information about which fish is good, would...probably help me. Like I’m kind of feeling like now I should figure out which fish are good fish and then we can start eating those again.”
	Many women liked tuna fish but were confused about whether they could continue to eat it and, if so, which types to eat.	“I used to eat canned tuna, and then I read that you shouldn’t eat tuna, but I didn’t know it was the more fatty one, so I just didn’t eat it at all.”
2. Advice	Many women were also confused about whether they could eat shellfish.	“I’ll be at a place that has shellfish and I’m not totally sure if I can have that.”
	Some received written information about the risks of fish intake, but few had a discussion with their obstetrician.	“They just say stay away from it, I don’t really have a reason, just you know, it’s not safe for the baby.”
	Women were not told which fish types are safer to eat.	“My take away from the conversations I’ve had is like, ‘you should avoid fish because of the high mercury content’ and there wasn’t really the distinction made between good fish vs. bad fish. I mean, some, but, you know, the overall takeaway message with fish was ‘avoid it.’ So had there been more discussion about like, ‘here are the good fish you can eat’ and, you know, the positive aspects, I might be eating more fish.”
3. Behaviors	Women received no encouragement to eat fish during pregnancy.	“I haven’t eaten fish at all during these entire 36 wk and no one’s really pushed me or told me, ‘you should probably increase your fish intake’ ”
	Sushi was a main source of fish intake before pregnancy that was eliminated during pregnancy.	“I love sushi so that was a huge one for me and that just went out the window.”
4. Barriers	Many women reduced or eliminated their fish intake with pregnancy.	“My husband and I were trying to get pregnant, so I stopped.”
	Some women tried to get more DHA via supplements or supplemented foods.	“I definitely like the eggs and I eat a lot more eggs than I used to.”
	Women could not remember which fish types were better to eat during pregnancy.	“I just don’t remember which of the 10,000 fish I can have and I can’t. So I think I just lean toward the safe ones, because I’ve remembered that I can have them.”
5. Facilitators	Advice to avoid fish led many women to eat less fish than they otherwise would have.	“I often wish I could eat more than one serving a week...just because I like it and for the protein.”
	Some women perceived fish to be costly and something that needed to be eaten very fresh.	“I’ve always thought of fish as being expensive. Where with chicken I leave for a couple days in the fridge, fish I would want to make sure I use right away.”
	Some women experienced pregnancy-related aversions to fish.	“For a while, I was feeling really nauseous so I wasn’t cooking anything because opening the fridge was problematic ’cause it smelled bad. So... the fish would not be an appealing smell in the fridge, so it’s not allowed anymore.”
	Women were more likely to eat fish if their families also ate fish.	“If my husband is willing to cook it, we’ll have it, but otherwise we’re not having it.”
5. Facilitators	A portable list would help women eat more fish.	“I don’t like fish that well, but yeah, I would be more comfortable in the grocery store if I had this little card that I could pull it out and say ‘oh, look and I shouldn’t have it,’ or ‘hey, it’s on this list and I haven’t had it a couple weeks, so I should get it.’”
	If their obstetricians advised them to eat fish, they would do so.	“I wouldn’t say ‘no’ to eating it if I knew it was beneficial to me and the baby.”

(Continued)

TABLE 2 (Continued)

Themes	Major subthemes	Representative comments from focus group participants
6. Emotions	It can be scary to eat fish.	"I try to, of course, keep away from the seafood, just because that's what scares me the most."
	Fish consumption messages are conflicting and confusing.	"You know, it's a double-edged sword though because I've also read that if you don't eat enough fish you don't get enough omega vitamins and so to, like manage this balance between don't get enough mercury, but eat enough fish and it can get really confusing."
7. Diet philosophies	It is better to be safe than sorry.	"I know high, high, high levels can certainly do damage, I don't know if I believe that low levels can, so, but its just like it's not worth the anxiety to thinking that there could be some effect of the mercury."
	Women elsewhere eat fish and are fine.	"But I do think about like, I don't know, there are some communities like around the world where people eat a whole lot of fish. Some of these rules, I just put them in the context of history and it just doesn't feel right and it feels kind of arbitrary sometimes."

¹ DHA, docosahexaenoic acid.

opinion on what to eat when pregnant." None had learned anything about risks or benefits of fish intake from prenatal classes. Whereas many of the women had read about dietary advice on the Internet or in pregnancy books, they generally did not place a great deal of trust in these sources unless they were perceived to be very reliable. In general many felt that not enough information was readily available: "I just don't see it out there a lot, for it to stick in my head that, 'ok, this is the kind of fish that is good for you during pregnancy and this is what is not good for you.' I just don't see enough information about this subject."

Behaviors

Eleven of the women reported that they ate sushi before pregnancy and had stopped during pregnancy, which had the result of reducing their fish intake. Others had specifically changed their intake of particular fish types in response to fish consumption advisories: "The tuna steaks, or the big, thick steaks of swordfish, I know you have to be careful . . . so I've just cut those guys out completely now." Others reduced intake of fish types not included in advisories, even though they liked the fish and were eating it only occasionally: "I like haddock and tilapia but I don't eat it too often, probably once a month I would say. You know, when I was eating it. But now, I've really abstained from it." Some reduced their fish intake in anticipation of pregnancy: "[before pregnancy, I was eating fish] probably once to twice a week. But my husband and I were trying to get pregnant, so I stopped."

Intake of tuna fish in particular decreased from before pregnancy, in part because women were no longer eating tuna sushi. Also, several women limited or reduced their intake of canned tuna fish: "I used to add tuna on top of a salad at the salad bar. But I don't do that anymore."

Only one woman, a nutritionist herself, mentioned that she was interested in increasing her intake of fish during pregnancy, though she had not actually done so. Some sought out DHA-enriched eggs or DHA-containing prenatal vitamins. A few were taking fish oil. However, most had not changed their diet to increase the intake of omega-3 fatty acids or DHA.

Barriers

Lack of knowledge regarding which fish types are safer to eat during pregnancy emerged as a common barrier to fish consumption. "Oh, the other one is you can have some canned tuna but not other canned tunas, so I just didn't do anything. I'm like, 'I'm not eating canned tuna. That's done'." Another woman similarly said: "Since I'm not gonna take the time to figure out which one is safest to eat, I'm like 'ok, I'm not gonna stress myself out with trying to find out what's the best.'" Some of the women were limiting their overall fish intake because they were told to eat a certain amount: "I often wish I could eat more than one serving a week, because I often find myself wanting tuna salad a lot, just because I like it and for the protein."

In some cases, the women's inability to remember which fish types are more or less healthful led them not to eat fish at all. "But the dietician that I saw, I honestly can't remember what she said about good fish and bad fish . . . so I've just been avoiding fish based on that conversation." In other cases, the women remembered a few types of fish that are safer to eat, and limited their intake only to those types: "I feel like it's hard to remember which fish are safe when you're out. So it's nice to be able to be like 'salmon I know is always safe'."

Whereas some women felt that pregnancy-related nausea or aversions made them less likely to eat fish ("It's mostly the smell too. That's what turns me off."), about the same number of women reported an increased taste for fish since becoming pregnant. A few felt that they did not want to eat anything that they had not tried before: "I don't think it's the time to be trying new stuff, during pregnancy."

Many felt that fish was expensive: "I think a lot of it comes down to the cost. I mean, we haven't had salmon in months just because of the cost;" "sometimes you want fish but like it goes back to the cost. Sometimes the fish is too expensive where you can just get a couple of chicken breasts and call it a day;" "part of it also is that it's more expensive than turkey, so you know . . . probably one of the reasons and it's not like I crave it so much that I would put money aside to buy it." Other barriers to fish intake included the women's preference to eat only very fresh fish, the perception that fish can be difficult to prepare, or the fact that

other family members, especially children, may not like fish: “with my husband being vegetarian and my daughter, I know she’s not gonna eat it, so then it’s kind of pointless . . . that’s a factor for me. No one to share it with.”

Facilitators

Facilitators to fish consumption included having a husband or partner who liked or prepared fish, or family traditions that included fish: “My parents always did lobster for New Years.”

Many women thought that if they were told how much or which types of fish they could safely eat, they would be more likely to eat more fish: “If I was told the type of fish to buy, if it was recommended that this is the kind of fish that pregnant women should eat, I would . . . buy that fish.” A number of participants would have liked a list they could keep with them: “I can never remember—that’s the problem. I feel like you need to fold up this list and keep it in your back pocket.” Many mentioned that a wallet card in particular would be very helpful: “I feel like I need a wallet size card—I’m not kidding, that has, like, one side with fish to avoid and the other with fish that’s safe, good to eat when you’re pregnant. So that like when I’m out shopping, or if I’m out eating and I can’t remember if the fish is ok, I’ll have something to consult with. It sounds a little ridiculous, but I almost wish I got that at my OB’s office.”

Emotions

As women discussed the fish consumption messages they had heard, many expressed frustration and confusion because “it’s a double-edged sword:” “the mercury levels are too high, yeah. Which is concerning, because, I don’t know . . . it’s conflicting again. You hear that fish is so good for you, yet on the other hand it’s filled with mercury and we need to look out for that . . . but yet we’re supposed to eat it at least twice a week.” Another was similarly bewildered: “that’s the main thing I find confusing, so like salmon, that’s a pretty big fish, so maybe we shouldn’t eat it, but then maybe we should eat it because, like it’s higher in mercury but it’s also higher in good fat, so don’t eat it, but no, do eat it.”

Many of the women used negative or fearful language when talking about fish intake. If they chose to eat a fish that might be higher in mercury they were being “bad”: “I had scallops the other day and I wasn’t sure whether I was being bad or not.” One commented that fish carries a “stigma.” The fish consumption messages they had seen ranged from “a little bit stressful” to making them feel afraid: “there’s been a lot of literature at the hospitals about eating fish and things like that and that’s just something that I stay away from, just because of the scares about the mercury level and things.” Another woman reflected: “we talk about omega-3s and yet we’re so scared to eat any fish and I think that’s all people talk about instead of focusing on ‘here are the fish you can’t eat’ and they tend to be the ones that you don’t consume, besides swordfish, the ones on the list are not very common. So I think it’s just kind of ironic that we’re so scared of it, but yet that’s one of the things that, you know, nutrient-wise is definitely quite beneficial during the pregnancy period.”

Diet philosophy

When it came to mercury exposure, many of the women felt that it was better to be safe than sorry: “why take a chance?”

Some representative comments include: “When I think about mercury, I just wanna stay away;” “It’s not worth it . . . I can get by without it.” Several expressed that avoiding all fish seemed to be safer than making a wrong choice: “I just always feel like I never know what the right thing is to do and I don’t want to do something wrong and, you know, have something bad happen.”

Even when they heard messages that contradicted their judgment, some followed the cautionary principal: “I would have thought you kind of should eat it more than that, but I don’t, I eat it less.” “But I’ve heard shrimp has high mercury. Which didn’t make any sense to me. So I’m now staying away from shrimp.”

However, others were more phlegmatic in their approach to the messages they had received: “We’re not supposed to eat shellfish. Which . . . I have eaten lobster twice and shrimp on various occasions. So I think, I don’t know—I like to live by the old rule of thumb that—everything in moderation.” Several mentioned that they followed their own instincts rather than a strict dietary guideline: “I take the once a week rule or whatever it is with a grain of salt. And go more with what I know about my body and like my experience with fish oil has informed my fish consumption more than, like, what my midwife tells me.” Others mentioned that women elsewhere are less mindful of their fish intake and appear to do fine: “I figure women in developing countries have babies all the time that are totally healthy and if I eat like a couple pieces of sushi here and there, it’ll probably be fine.” “My friend who grew up in Japan she’s like ‘you know, people in Japan they eat sushi when they’re pregnant.’ So it’s another of those things where one culture does it and another doesn’t. So who do you go with?”

DISCUSSION

Among pregnant women who were infrequent fish consumers, most knew that fish may contain mercury, a neurotoxin, and had received some advice to limit or avoid intake of fish. However, fewer knew that fish contains DHA or what beneficial health effects DHA may have. None reported having received advice to eat fish as a way of increasing their DHA intake, and most had not received any information about which fish types are safer to eat. Advice to limit intake of fish, as well as their inability to recall or have a ready source of information about which fish types they should be eating, led many women to eat less fish than they might otherwise be eating. Faced with a lack of available information, many women avoided fish rather than possibly expose themselves or their babies to harm.

Several studies have reported on the characteristics of women who eat more or less fish, based on surveys or dietary questionnaires. Women who are older, are better educated, have higher income, or live in coastal areas tend to eat more fish and elongated omega-3 fatty acids (11, 12). Only a few qualitative studies have been reported. Troxell et al (13) have reported on work they performed among pregnant women enrolled in the Special Supplemental Program for Women, Infants, and Children (WIC). They used focus groups to develop and evaluate an intervention to increase dietary DHA intake among pregnant women by promoting consumption of salmon, sardines, tuna, and DHA-enriched eggs. These investigators did not provide detailed results from the focus groups, but did report that a primary motivator for the women to change their behavior was benefit to the infant. We did not find any qualitative studies among pregnant

women that included discussions of both health risks of contaminants as well as benefits of DHA within fish.

Other studies, mostly conducted outside of the United States, have focused on factors influencing fish consumption by adults and families. As in our study, important factors influencing fish consumption among adults in the general population are taste preferences, price, and convenience (14, 15). Among mothers of young children in Australia, several findings were similar to those in the current study, including that the preferences of other family members and perceptions that fish is expensive might be barriers to fish intake (16). However, unlike among the pregnant women we studied, concerns about contaminants did not influence consumption, and arguments for the beneficial health effects of fish were not likely to overcome barriers to intake. These differences may have been because public health advice regarding fish consumption differs between Australia and the United States, because the health risks of mercury and benefits of DHA are particularly salient during pregnancy or because it can be more difficult to change the dietary habits of a child compared with oneself.

Olsen (17) has proposed that, among adults, almost all consumers agree that fish is healthy; therefore, the perceived health value of fish does not explain much variation in fish consumption. However, in a survey of adults in Belgium, consumers were better aware of the content and effect of harmful substances than of nutrients in fish, and many did not know that fish contains omega-3 fatty acids or what health effects these nutrient may have (18). This finding is similar to our results, ie, that women were more aware of and influenced by the potential health risks of contaminants in fish rather than the potential nutritional benefits.

The present study had several strengths, including discussions of both potential health risks and benefits associated with fish consumption. We included women of diverse race-ethnicity. Although the study population was small, results were similar across all 5 focus groups, and we did not discover any new themes after our initial analysis of the first group. We limited participation to women who were consuming <2 fish servings/wk; results may have differed between women who are more frequent fish consumers. Also, because all participants lived in the greater Boston area, the results may not be generalizable to women living in other areas of the United States, to women with less education, or to different ethnic groups than those included in the present study.

In conclusion, many pregnant women have received the message that fish may contain mercury—a contaminant potentially harmful to the fetus. However, women are less aware of the health benefits of DHA, and many do not know which fish types are likely to be low in mercury and higher in DHA. Pregnant women who infrequently consume fish might be willing to eat more fish if they received advice to eat some fish from their obstetrician or other sources and if they had a clear, readily accessible source of information regarding which fish types are safe to eat during pregnancy. The results from this study might be useful for public health officials or others planning educational interventions regarding fish consumption during pregnancy.

We appreciate the participants' input; the invaluable assistance we received from Matthew Gillman, Christina Kamins, and Barbara Kaufman; and the substantive comments we received from Julia MacDonald, Ashley O'Brien, and Elsie Taveras.

The authors' responsibilities were as follows—EO: responsible for the study design, data collection, data analysis, writing of the manuscript, and obtaining funding; AB: contributed to the data collection, data analysis, and writing of the manuscript; LBG: contributed to the study design and data collection; SP: contributed to data collection; and ROW and DP: contributed to the study design and to obtaining funding. All authors approved the final version of the manuscript. None of the authors had a conflict of interest to report.

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