A Case Study of Reaching High-Risk Foodborne Illness Audiences: People with Diabetes and Pregnant Women

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Background – Highest risk for foodborne illness

- Pregnant women
- People with diabetes
- Seniors
- Young Children
- People with weakened immune system (diseases or medication)

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Background – Current Food Safety Education

- Current educational program:
  - Use informational sheet
  - Limited material designated for specific high-risk audience

- Previous studies reported that food education is most likely to be effective if the programs and materials are tailored to the needs of a specific audience (Altekruse, Yang et al. 1999, Deon, Medeiros et al. 2014).
Objective

- Develop a novel food safety educational program, which uses a positive deviance approach.
- Understand barriers for people with diabetes and pregnant women
Method – Positive Deviance

- Based on the observation that in every community there are certain individuals whose uncommon practices enable them to find better solutions to problems than their neighbors or colleagues despite having access to the same resources.

- Goals:
  - Identifying best practice
  - Promote the best practice within the community or group.
Method – Recruitment – People with Diabetes

- **Six** groups of people with diabetes (sample size n=32, with 30 finishing the study, **age 40-75**) participated in three 1.5-hour focus group sessions.
- Recruited from UC Davis Health Center Health Management and Education classes, with a recruitment ratio 1:4.
- Conducted **weekly** at UC Davis Health Center campus in Sacramento.
Method – Recruitment – Pregnant Women

- **Four** groups of pregnant women (sample size n=34, with 28 finishing the study, age 20-40) participated in three 1-hour focus group sessions.
- Twenty-nine, from Sutter Health Group, Davis, California, during their by-weekly group programs, with a recruitment ratio 1:1
- Five from Program for Women, Infants, and Children (WIC), Woodland, California, with an unknown recruitment ratio.
Method - Procedure

- Three sessions of discussion group with four to eight people in each group.
- Session topics: Cook and Chill, Clean and Separate, and Choose safe food
- Take-home tasks addressed their behavior and attitudes toward following recommendations regarding temperature control and cross contamination
- Pre- and post- survey assessed knowledge, attitude and personal hygiene.
Results – Motivators

People with Diabetes
- Health management with diabetes
- Food choice with diabetes

Pregnant Women
- Smooth childbirth
- Fetus health
- Uncomplicated pregnancy
Results – Barriers

Personal factors:
- knowledge
- cooking habits
- taste preference

Social/cultural factors:
- social pressure
- living environment

Medical condition factors:
- Diabetics
- Pregnancy
Results - Barriers - Personal Factors

- Knowledge level:
  Knowledge gap was found in both the survey results and discussion.

Representative Quote:
“I don’t know the temperature in my fridge, as long as the beer is cold, it should be good.”
**Results – Barriers – Personal Factors**

- **Cooking habits:** Participants reported that they learned cooking skills and safe food handling from their home economics classes or their parents’ kitchen. These habits, followed for years, become natural to follow.

  **Representative Quote:**
  - Behavior: do not wash poultry
  
  “Wow, this is impossible. If I don’t wash the chicken, I don’t know how to cook it. You know, it is slimy and, sometimes, has blood on it.”
Results - Barriers - Personal Factors

- Taste preference:
  - Pregnant women, many said they really have the craving for certain food, like ‘cold hot dog’ (Listeria potential).
  - Persons with diabetes, some just like their beef to be rare.

Representative Quote:
- “I know I shouldn’t eat sushi containing raw fish, but sometimes, that is the only thing I want to eat.” (pregnant women group)
- “I grew up with running yolk eggs. It tastes so much better with running yolk.” (diabetics group)
Results – Barriers – Social/ Cultural Factors

Social pressure:
- Using cooking thermometer, and avoiding cross-contamination are the two most difficult behaviors.
- People think color and appearance are as accurate as cooking thermometers, and some feel they look inexperienced if they use a thermometer.

Representative Quote:
- “Well, it can be very hard to avoid it (cross-contamination) in a friend’s dinner party. If I keep reminding others on following the ‘rules’, I don’t think I will get invited next time.” (cross-contamination)
- “My husband is the burger chef, he just has the magic to know when it is done, just by touching.” (cooking thermometer usage)
Results – Barriers – Social/Cultural Factors

Living condition:
- Some participants traveled or lived for several months outside of the U.S., and they had limited access to safe food and water.
- When eating out, people have more limited food safety choices.

Representative Quote:
- “I live in China part of my year. In their supermarket, they don’t even put all of their yogurt in the fridge. Even if they do, you can feel it, it is not ‘cold’ cold.”
- “But waiters have never asked me what temperature I want for my burger, they just ask whether I want medium, medium rare or well done.”
Many people with diabetes need to eat early in the evening. Meal preparation is rushed. Following safe food handling, especially changing an established habit, is challenging.

**Representative Quote:**

-Bette’s physician advised her to finish dinner before 6:00pm everyday.

“My schedule is very tight in the evening. I come back home at five, and take care of Alice (granddaughter), and in the same time cook, and eat...you know, during that time, washing hands for 20s or checking the cooking temperature is just difficult.”
‘Morning sickness’ is hard enough, not to say adding ‘safe food handling’ to my plate.

Moms-to-be are so concentrated on their fetus. Other medical condition risks seems higher than getting ‘foodborne illness’, so it is hard to focus on ‘safe food handling’.

Representative Quote:

“After getting pregnant, I have read so much about ‘this is good for you, and that is bad’. I am already confused about what to eat. Now (with the food safety information) I start to worry about my cooking.”
Results – Positive Deviance Behavior from People with Diabetes

Clean
Using paper towels to dry hands in kitchen

Separate
Have two plates ready for BBQ, one for raw meat, and the other one for cooked meat

Cook
Using Cooking Thermometer

Chill
Using Refrigerator Thermometer

Choose
Paying attention to ‘Pasteurized or unpasteurized’ milk, when choosing soft cheese.
Results – Positive Deviance Behavior from Pregnant Women

- **Clean**: Washing hands before touching food.
- **Separate**: Using cutting boards for ready-to-eat foods first, and then for ‘raw’ ingredient for cooking.
- **Cook**: Using Cooking Thermometer
- **Chill**: Using Refrigerator Thermometer
- **Choose**: Choosing pasteurized juice
Results – take-home task I

Example:

<table>
<thead>
<tr>
<th>Name: Susan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refrigerator Thermometer</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Food thermometer</td>
</tr>
<tr>
<td>Item</td>
</tr>
<tr>
<td>Chicken Breast</td>
</tr>
<tr>
<td>Left-over Chive soup</td>
</tr>
</tbody>
</table>
Results – Take-home Task

People with Diabetes Group Reported Home Refrigerator Temperature

- door
- topshelf
- bottomshelf

Temperature:
- 36 to 37
- 38 to 39
- 40 to 41
- 42 to 43
- 44 to 45
- 46
- 47
- 48
- over 48
Results – Take-home Task

Pregnant Women Reported Home Refrigerator Temperature

door  topshelf  bottomshelf
Results – take-home task II

Example:

Name: Andy
How do you use those two cutting boards? (separate or mixed)
Mixed

Cleaning checkbox

<table>
<thead>
<tr>
<th>Item</th>
<th>How many times you cleaned in this week</th>
<th>How you cleaned (paper towel or cloth)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Utensils</td>
<td>I I I I I I</td>
<td>air dried</td>
</tr>
<tr>
<td>Countertop</td>
<td>I I</td>
<td>cloth</td>
</tr>
<tr>
<td>Sink</td>
<td>I I I I I I I</td>
<td>cloth</td>
</tr>
<tr>
<td>Cutting boards</td>
<td>I I I I I I</td>
<td>paper towel</td>
</tr>
</tbody>
</table>
Results – take-home task II

Frequency of cleaning activities in a week - both people with diabetes group and pregnant women group

- Utensils
- Countertop
- Sink
- Cutting boards
Results – Comparison between People with Diabetes and Pregnant Women

Knowledge Survey Example-“Who are at increased risk of foodborne illness?”

- Pregnant Women
- People w/ weakened immune system
- People w/ chronic diseases
- People w/ diabetes
- Older Adults
- Young Children

PERCENTAGE OF CORRECT RESPONSE

PERCENTAGE OF CORRECT RESPONSE

Diabetes-Post  Diabetes-Pre  Pregnant-Post  Pregnant-Pre
Irradiated food

- People with Diabetes: Much more open to the idea of irradiated food, around two thirds responded they would like to ‘try’ irradiated food, if it is safer to eat.

- Pregnant women: About one third responded they would like to ‘try’. Many said they had not seen evidence that irradiated foods are safe.

- Pregnant women group raised lots of questions about the controversy topics, like genetically modified food. Most of them were negative about un-natural concepts in food.
Discussion - Difference between Pregnant Women and People with Diabetes

- Short-term condition vs. Long-term condition
- Recruitment (University community vs Metropolitan area)
- Age-group (18-39 vs 45-79)
- Motivation (Childbirth vs improved diet and health)
Take-home messages - Recruitment

- To reach the target audiences, food safety educators must gain the support of health educators currently offering pregnancy or nutrition management programs.
- Adding food safety education to these existing programs is more likely to attract the target audience compared to offering food safety education alone.
- Mentioning surprising food safety information during recruitment motivates the audience to attend.
Take-home Message – Education

- The target audiences want to learn how to safely handle food and why specific actions should be taken.
- Props can help dramatize facts on bacteria multiplication or cross contamination
  - Take-home tasks
  - Visualized bacteria growth
  - Videos on chicken washing
- The positive deviance approach identified role models for certain safe food handling behavior, and encouraged discussion and involvement of the target audiences.
Overview and Future Work

- A curriculum will be developed from this work for people with diabetes. This will help protect people with diabetes from infections and other complications resulting from foodborne illness.
- Future positive deviance food safety projects should include more high-risk population groups, like people with compromised immune systems.
- This study was based on self-report data. More observation data will validate this work.
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