

# Assessing the Impact of Environmental Counseling on Pregnant Women's Perception and Behavior Regarding Chemical Hazards

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## Abstract

The purpose of this study is to determine the importance and influence of environmental hazard counseling for pregnant women in a clinical setting. We aim to identify changes in risk perception and behavior of pregnant women after receiving educational materials describing exposure pathways, and a counseling session on recommendations and preventative measures. Specifically we will:

- Use a survey tool to assess pregnant women's baseline knowledge, perception, and behaviors in relation to select categories of known chemical contaminants in food, water, and ambient environment.
- Provide educational materials and one-on-one counseling about environmental exposures and recommendations to reduce risk.
- Conduct a post counseling survey to determine changes in knowledge, perception, and any modification of behavior
- Analyze methods and results of one-on-one environmental counseling as an intervention method

## Introduction

- The chemical industry is an integral part of the US economy importing and/or producing roughly 27 trillion pounds of chemical substances per year. These synthetic chemicals are being used in agricultural fields (e.g., pesticides, fertilizers), in our houses (e.g., oil based paints, insecticides, perchlorate), and being found in our food and water (e.g., herbicides, lead, biphenyls, mercury).
- Many organizations including the American Academy of Pediatrics, the Endocrine Society, and the President's Cancer Panel recognize that some prenatal exposure of environmental contaminants can be associated with adverse birth outcomes and abnormalities in early childhood development with the potential for long-lasting impacts.
- The National Health and Nutrition Examination Survey data demonstrated widespread exposure to environmental chemicals among pregnant women and women of child bearing age included heavy metals, volatile organic compounds, and endocrine disrupting chemicals.
- Some of the common abnormal birth outcomes experienced includes small for gestation age, low birthweight, preterm delivery, neurological disorders, and congenital defects. As development occurs in the womb, exposure to certain environmental chemicals leads to adverse health outcomes that may be exhibited across the lifetime of the individual and can possibly be passed down from generation to generation.
- One of the most effective ways to prevent exposure is through proactive communication and education. The role of public health practitioners in the prevention of chemical exposure to pregnant women and their unborn fetus is critical. However, most gynecologists often discuss diagnostic tests and risks associated with smoking and drinking.
- A recent study on obstetricians found that 78% of obstetricians agreed that they can reduce patient exposures to environmental hazards by counseling patients, but 50% reported that they rarely take an environmental health history. They also found that less than 20% reported routinely asking about environmental exposures commonly found in pregnant women.
- Currently, there is no well-organized program or system in place in a clinical setting to educate pregnant women about chemical hazards at home or in the workplace. In order to ensure pregnant women aren't overly exposed to environmental hazards, environmental health needs to be an integral part of prenatal care and medical education for future medical students.

## Materials and Methods

- I. Using an evidence based approach, a literature search on human and animal toxicological studies with confirmed evidence of adverse health effects were selected to identify categories of environmental hazards.
- II. Prenatal hazards like smoking and alcohol consumption were omitted from the categories of hazards because national campaigns and health professionals adequately cover health outcomes and preventative measures to these toxicants.
- III. The gathered information from the studies was used to prepare a pre and post-counseling questionnaire, design a counseling session layout, and develop educational materials in the form of a brochure and grocery card.
  - A. The pre-survey was conducted during the patient's scheduled prenatal visit where they answered questions on demographic information, food and water intake, and general information about indoor/occupation environments
  - B. The counseling session followed the pre-survey where dissemination of educational materials and private dialogue for recommendations to influence the participants existing knowledge took place.
  - C. The post-counseling survey was conducted roughly one month after the initial visit where they will be asked questions about changes in behavior and current perception of risk related to chemical hazards during pregnancy

Figure 1: Grocery Card

The Dirty Dozen		The Clean Fifteen	
<b>Fruits</b>	<b>Veggies</b>	<b>Fruits</b>	<b>Veggies</b>
• Apples	• Celery	• Avocados	• Asparagus
• Cherry	• Potatoes	• Cantaloupes	• Cabbage
• Tomatoes	• Snap Peas	• Grapefruits	• Cauliflower
• Cucumbers	• Spinach	• Kiwis	• Eggplant
• Grapes	• Sweet Bell Peppers	• Mangoes	• Frozen Sweet Peas
• Nectarines		• Papayas	• Onions
• Peaches		• Pineapples	• Sweet Corn
• Strawberries			• Sweet Potatoes

Figure 2: Front Panel of Informational Brochure

**HEALTHY [WATER USE]**  
Drink filtered water. Water from the tap may be contaminated with low levels of pesticides, heavy metals, and other chemicals. Drinking filtered water can reduce your exposure.  
Run your tap water before use. Run cold water for 30-60 seconds before using it for drinking or cooking and hot water for a couple minutes before bathing.  
Stay informed about your water. The United States Environmental Protection Agency (EPA) provides information about contaminants in your water.  
Get your water tested. If you have a private well, it is best to test for safety. Having your water tested can help you get it tested on your own. For more information, go to [www.epa.gov/groundwater](http://www.epa.gov/groundwater) or [www.epa.gov/groundwater](http://www.epa.gov/groundwater).  
Reduce the amount of time you spend in pools or hot tubs. You may be increasing your chance of exposure to disinfection byproducts (DBPs). If possible, wear a mask that covers your face when you are in a pool or hot tub.  
For any health related issues, please contact your care provider.  
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**RESOURCES**  
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**HEALTHY LIVING [FOR YOU AND YOUR BABY]**  
RICHARD M. FAIRBANKS  
SCHOOL OF PUBLIC HEALTH

Figure 3: Back Panel of Informational Brochure

**HEALTHY [EATING]**  
Wash your fruits and vegetables well. They may contain traces of pesticides, chemicals that can harm your baby.  
Limit fish to two servings (12 oz.) per week. Fish may have residues of mercury, a heavy metal that can affect the development of your baby. If you are eating fish that caught in local waters, follow local fish advisories for consuming.  
Eat organic, unprocessed food when possible. The potential for contamination is less likely for organic and unprocessed food.  
Use glass and ceramic containers for reheating food or consuming hot liquids. Avoid using plastic containers. Check the bottom of your plastic containers for identification codes (1-7). If they contain numbers 1-3 or 6-7, they contain bisphenol A (BPA), chemicals that can leach into your food.

**HEALTHY [HOMES]**  
Avoid exposure to lead paint. Stay away from peeling or chipping paint. If you have lead-based paint, you may want to have it tested. If you have lead-based paint, you may want to have it tested. If you have lead-based paint, you may want to have it tested.  
Stay away from pesticides. Avoid using or spraying pesticides inside or outside your home without proper ventilation.  
Remove your shoes at the door. Remove your shoes at the door to avoid bringing dirt and other chemicals into your home. Shoes can contain lead and other chemicals that can be tracked into your home.  
Clean in well-ventilated rooms or areas. Use fans or open windows when cleaning with strong cleaning products. Always open a door or window to get air to circulate to avoid inhaling their vapors. Avoid mixing chemicals when cleaning.

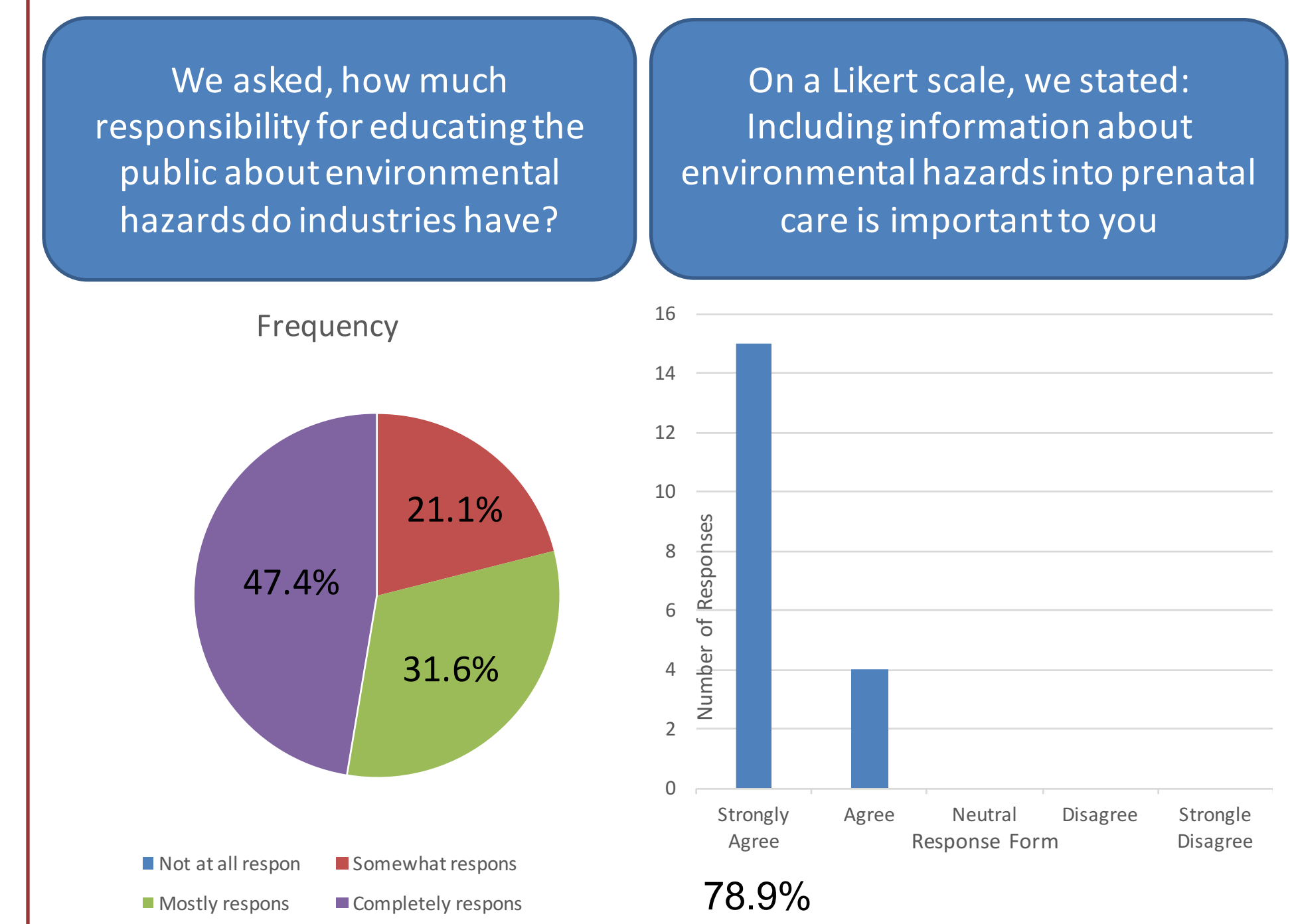
**HEALTHY [WORKPLACE]**  
Examples of jobs at higher risk for chemical exposure include:  
• Janitors, maids, and cleaning professionals  
• Gardeners, farmers, and greenhouse workers  
• Healthcare workers, dental personnel, and laboratory technicians  
• Dry cleaners  
• Battery makers and welders  
• Construction workers  
• Ethicalists, hair stylists, and nail technicians  
If you or anyone in your household are at risk for chemical exposures in the workplace, protect yourself and your household members by:  
• Wearing protective equipment, including gloves and goggles  
• Changing your clothes and shoes before entering your home  
• Washing your hands and avoiding eating, drinking, or smoking  
• Working in well-ventilated areas  
• Not mixing or spraying pesticides while pregnant or breastfeeding

## Current Status of Research

The pilot study is currently on-going with an anticipated goal of 40 participants. The study was conducted in a clinic that predominantly serves minority patients and those of low socioeconomic status. The following are initial observations of participants pre-survey:

- Current environmental disasters like lead in drinking water in Flint, MI has gained the attention of expecting mothers
- When biological samples are not being taken, participants were more willing to engage in the study
- Language barriers were present as most participants were minorities from low socioeconomic status which may have reduced the quality of the counseling session and create bias
- Indiana's WIC nutritional program had pre-exposed participants to healthy nutrition, however it is plausible they did not educate them on the environmental hazards associated with unhealthy nutrition.
- Mothers who had multiple children were reluctant to be a part of the study because they perceived they wouldn't learn anything new due to their experience with prenatal health care

Of the 40 enrolled, 20 participants completed their pre-survey responses where their results have been put in graphical form based on their answer choices.



## References

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