Developing Effective Risk Communication Strategies to Reduce Carbon Monoxide Poisonings

Carbon monoxide is a major cause of unintentional poisoning throughout the world. This serious health risk in the Paso del Norte region is particularly high among low-income residents of Ciudad Juárez because they rely on unvented wood and gas heaters in the winter.

In the last 12 years, 1,381 people living in Ciudad Juárez, México, have been intoxicated, and 167 more have lost their lives to carbon-monoxide poisoning according to Diario de Juárez. In 2003 there were 128 reported non-fatal intoxications and 15 deaths in Ciudad Juárez from carbon monoxide poisoning.

This pilot project generated an immediately useful risk communication protocol to inform the public of the health hazards of carbon monoxide poisoning from unvented heat sources.

Objectives

This research project generated an immediately useful risk communication protocol to inform the public of the health hazards of carbon monoxide poisoning from unvented heat sources. The mental models framework as developed by Morgan, Fishhoff, Bostrom & Atman (2001) was used to design the risk communication protocol. In addition, diffusion of innovations theory (Rogers, 2003) and entertainment education principles (Singhal & Rogers, 1999) was used to develop a pilot communication protocol aimed at informing people of CO dangers to help reduce the likelihood of CO poisonings and deaths in the areas of study.

Thus, the study focused on achieving the following goals:

* Establish baseline knowledge of the CO problem in the area via a combination of expert and
public semi-structured interviews.

* Develop a culturally sensitive communication protocol to inform people of the dangers of CO and to provide people with information to make safer their use of indoor heaters.

* Identify opinion leaders within the target community to promote to their peers in Ciudad Juárez neighborhoods the safety strategies suggested by local experts and reported in the communication protocol.

* Measure the success of the health campaign to improve the development of future campaigns.

Risk Communication- Mental Models Approach

The following outlined steps was an overview of the methodology followed for the project. Some of them are already completed while others are in the process of completion.

1. The creation of an expert model of the risk, in this case carbon monoxide poisonings thru interviews with experts in the field such as health experts, emergency respondents (such as firefighters), and public authorities.

2. The creation of a lay people’s model, that will reflect the knowledge of the people in the community with regards to carbon monoxide poisoning and the use of heaters. This information was collected by conducting a total of 22 semi-structured interviews.

3. The models were compared and any gaps between them identified. Those gaps will be addressed more thoroughly in the structured interviews.

4. The structured interviews will be conducted to 150 people. These interviews are also known as confirmatory questionnaires in order to identify the most widely held misconceptions and evaluate their impact.

5. Analyzing the information from the confirmatory questionnaires the risk communication protocol is created addressing pertinent correct beliefs and discouraging important misconceptions. The communication protocol will be presented using opinion leaders, focus group meetings, and comic books.

Diffusion of Innovations

Diffusion of innovations (Rogers, 2003) identifies four elements for an effective communication protocol that effectively communicates risks and suggested behavior changes to public populations, including those of low socioeconomic status. The proposed protocol builds on these principles:
The protocol developed to be compatible with the knowledge level and cultural norms of the target population. The information will be defined as an *innovation* (an idea or technology new to the target population) that is presented to audiences free of extraneous and overly specialized knowledge (Rogers, 2003).

The protocol identified opinion leaders within the neighborhoods of study to help promote behavior change among their families and peers. Interpersonal networks work well to trigger social change and can benefit from mass media campaigns that identify a problem and propose a solution (Rogers, 2003).

The protocol provided audiences with evidence that illustrates the advantage of adopting safer indoor heater use, for example, maintaining good ventilation in the home. Illustrations of relative advantage helps people identify reasons for altering their behavior and the cost/benefits of such actions and will be featured in the comic books.

The protocol was client-oriented by being made relevant to people’s needs and daily lives. It is particularly important that such information also be framed within a culturally sensitive framework (Kim, 2001).

**Mental Model**

An influence diagram is a directed graph, with arrows or “influences” connecting related “nodes.” They were developed by decision analysts as a convenient way to summarize information about uncertain decision situations. For our project, influence diagrams are a convenient way to summarize the expert knowledge upon which a risk communication will be built. The link below will show the expert and lay people diagram created for the risk of carbon monoxide intoxication as an Excel spreadsheet. The yellow boxes note the aspects that were not mentioned by lay people during the semi-structured interviews, but were mentioned by the experts.

**Pictures**

Conducting Interviews  
Drafting questionnaires
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