

Ascertainment of Pesticide Exposures of Migrant and Seasonal Farmworker Children: Findings From Focus Groups

Resource ID#: 4387
Ascertainment of Pesticide Exposures of Migrant and Seasonal Farmworker Children: Findings From Focus Groups

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Background To design questionnaires for epidemiologic research among children of migrant farmworkers, researchers need to consider ways to best solicit information about pesticide exposures.

Methods Bilingual facilitators conducted five focus groups with either migrant farmworker mothers or their children (age range 8-16 years) in southern Texas and northeastern Colorado. Guided questions were used to assess activities of migrant farmworker children and the ways to best elicit information about exposure to pesticides.

Results Participants reported a large number of activities that may potentially expose children to pesticides through both direct and indirect routes. Prompting, indirect questions about chemical use, and use of local and trusted facilitators increased information elicited from focus group participants.

Conclusions These focus groups helped to provide information for developing questionnaire items related to pesticide exposure among migrant farmworker children, and highlighted the importance of using bilingual community interviewers and including children as respondents. *Am. J. Ind. Med.* 40:531-537, 2001. © 2001 Wiley-Liss, Inc.

KEY WORDS: farmwork; migrant; pesticides; cancer; childhood; Hispanic; Texas; Colorado

BACKGROUND

Little is known about the adverse health effects of pesticide exposure in children from early and chronic exposure. Most of what is known comes from studies of adults, among which a wide variety of effects have been reported. Acute health effects include irritant effects, systemic poisoning, and contact dermatitis; chronic health

effects include cancer, birth defects, neurotoxicity, and adverse reproductive effects [Moses, 1993; Sharp and Eskenazi, 1986]. Major conclusions from the National Research Council report, "Pesticides in the Diets of Infants and Children," led to the recommendation that multiple sources and pathways of exposure need to be elucidated for childhood exposures to pesticides that could aid in the estimation of risk for toxic effects. Children may have enhanced susceptibility to exposures because of differences in size, metabolism, and rapid growth [National Research Council, 1993]. Therefore, studies of adult pesticide exposure and associated adverse health effects cannot be extrapolated to children. Occupational and environmental exposures are especially relevant to farmworker children because of the proximity of the work and home environments. The studies that have examined pesticides and adverse health effects in children have not included

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Contract grant sponsor: National Cancer Institute.

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farmworker children. For example, studies of childhood cancer have focused on parent's occupation or general environmental exposures [Zahm and Ward, 1998]. These childhood cancer studies have been conducted using well-established questionnaires [Daniels et al., 1997; Zahm and Ward, 1998]; however, to the authors' knowledge, none has included items that could cover the range of activities that may expose migrant and seasonal farmworker children to pesticides (other than through prenatal or take-home routes of exposure via parents). Questionnaires tailored to this unique population are needed.

Focus groups may be especially useful in developing appropriate questions to ask of migrant and seasonal farmworker parents or children about children's activities for future epidemiologic studies. A focus group is an interviewing technique where researchers select and convene persons with relevant personal experience to discuss and respond to a set of guided questions related to the topic of research [Powell and Single, 1996]. Focus groups allow investigators to understand thought processes, to develop appropriate phraseology used to describe participants' experiences, to establish credibility in the community, to develop questionnaire items, and to review and comment on drafts of questionnaires [Morgan, 1993; O'Brien, 1993; Krueger, 1994; Aday, 1996]. Other benefits of this approach include the informal, social atmosphere, the flexibility to pursue unanticipated topics, and time efficiency in data collection [Krueger, 1994]. Darragh et al. [1998] used a focus group format with adolescent farmworkers to develop a survey questionnaire that examined safety hazards among Colorado adolescents living and working on family farms. This instrument was used with parents to elicit information about the chores and recreational behaviors their children engaged in while on the farm, and about the parents' views on safety behavior, learning, and risk taking.

Feasibility studies aim to determine the practicability of a future study or procedure [Last, 1995]; this report describes one such study, which attempted to identify a range of activities and tasks that might lead to exposures to pesticides among children of migrant and seasonal farmworkers. The study targeted migrant and seasonal farmworkers, mothers, and their children to identify ways of eliciting this information in epidemiologic studies. This study will aid in the development of a questionnaire that could be used independently or incorporated into a recently developed National Cancer Institute questionnaire for studies of cancer among adult migrant farmworkers.

METHODS

Investigators at The University of Texas School of Public Health (UTSPH) and at the Department of Environmental Health at Colorado State University collaborated with the National Cancer Institute to conduct five focus

groups. These focus groups were conducted during fall and winter 1997–1998 at two sites: southern Texas (three focus groups) and northeastern Colorado (two focus groups).

Texas Study Population

The Texas focus groups were conducted at La Grulla Middle School in La Grulla, Texas. La Grulla is a small, predominantly migrant farmworker community located in Starr County, one of 14 Texas counties on the Texas–Mexico border approximately 350 miles southwest of Houston. Three focus groups were conducted separately for migrant farmworker mothers, their sons ages 8–14, and their daughters ages 8–14 who attended La Grulla Middle School. Boys and girls were separated because of developmental issues, with the belief that the environment would be less inhibiting in same sex situations. Two bilingual facilitators led each group (one pair conducted the mothers' group; one pair conducted both the boys' and girls' groups). All of the facilitators were members of the community, except for one who was a well-established researcher who had worked with the community for more than 15 years. The investigators solicited names of mothers with children in this age range from the Texas Migrant Council. Consent was obtained by phone from the mothers at the time of invitation to participate and was confirmed at the time of the focus group. The mothers' focus group consisted of 11 women, ages 30–50 years. Their children ranged in age from 4 months to 22 years and all but one had a child 8–14 who participated in one of the two children's focus groups. All had migrated in 1997, and reported migrating from 2 to 42 years. The boys' focus group consisted of seven children 8–14 years of age. The girls' focus group consisted of six children 8–13 years of age. All of the children in both groups had migrated the previous year, predominantly to Washington State.

The focus groups were audiotaped and the co-leaders recorded supplementary notes. All focus group participants were Hispanic. The mother's group was conducted in a combination of Spanish and English; the children's groups were conducted primarily in English. A thank you gift (US \$10 Wal-Mart card) was given to each participant.

Colorado Study Population

The Colorado focus groups were conducted in Longmont, CO. Longmont is located in northeastern Colorado, about 20 miles north of Denver. The researchers conducted two focus groups at the Salud De Valle Health Care Clinic in Longmont, one with children ages 9–12 and one with adolescents ages 13–16. All study participants were Hispanic, male children of migrant workers in northeastern Colorado. Three children participated in each group. A bilingual member of the migrant outreach team facilitated

each group. This individual was also in charge of recruitment as she was familiar to many of the clinic patients. Consent was obtained from both the participants and their parents at the time of the focus group, with the consent forms fully explained by the investigator.

The participants spoke both English and Spanish, and the facilitator conducted the groups in both languages. Both focus groups were audiotaped to aid in later transcription. The researchers reimbursed each family US \$25.00 for their time.

Questions Asked

A number of open-ended, but guided questions facilitated the focus group discussions. Although the questions were not identical in Texas and Colorado, these questions focused on the range of activities farmworker children engaged in, with particular emphasis on those that may involve exposure to pesticides. Table I displays questions related to the general themes that guided the focus group discussions.

TABLE I. Guided Questions for Migrant Farmworker Focus Groups

Patterns of activities by age

- What ages for childcare, begin working in fields, staying home by oneself?

Children's activities while parents worked

- Where do you stay and what do you do while parents work?
- Do you play games in or near fields...what kind?
- Any different activities when very hot?

Use of chemicals

- Ever use/mix chemicals on plants, crops, animals?
- How do you use chemicals...spray?
- Are you around people who spray?
- What safety information are you given?

Use of protective equipment

- Do you wear a mask, gloves, goggles, apron, rubber boots?

Washing and consumption of fruits and vegetables

- What kind?
- Grow own?
- Spray garden?
- Wash before eating?

Availability of running water

- Is there running water available to wash hands?

Contact with farm animals and pets

- Are you around farm animals?
- Are you around pets?
- Have these animals been treated for fleas?

Sensitive questions

- Do children your age smoke?
- Have you ever been treated for lice?
- Did you breastfeed your babies...how long? [to mothers]
- Are these questions appropriate to ask?

Questions were tailored to be appropriate for mothers' or children's groups.

Data Analysis

Taped discussions were transcribed and enhanced by notes taken during the focus groups. The data were analyzed using descriptive methods [Krueger et al., 1994]. The investigators examined and analyzed the transcriptions into categories classified by the guided questions. The topics included the activities and exposures reported by the participants regarding their work on the farm by subject area: children's activities while parents are working; parents' and children's farmwork; chemical exposures; protective clothing; food and water; animals; and sensitive questions.

The Texas and Colorado focus groups were conducted independently, using different scripts and sampling strategies. However, given that each site had the common goal to provide insight into the range of children's activities and possible sources of exposure to pesticides and ways to elicit this information, the results were combined and grouped into the categories specified above and are presented together. Differences among the groups, both within and between sites, are noted.

RESULTS

Children's Activities While Parents are Working

The participants described a number of activities the children engaged in while the parents were working. The mothers reported not taking their young children to work because it was dangerous. They reported that children go to daycare until they are old enough to go to elementary school. The elementary school age children often attended summer school. Many younger children reported that they stayed at home while their parents worked. One boy reported that a program in Minnesota, called the Migrant School, was available for children who did not have babysitters. One child said that he played in a park close to home. The games or activities that children reported playing included ball, "water with dirt," "hiding in the dirt," and one boy reported "getting in the fields with his cousin." One mother reported that their children went into bayous/irrigation channels close to the fields. When the temperature was hot, the children reported that they would do such things as get under a tree, go inside a car, go outside and drink cold water, wet down with a hose, or swim in a channel to cool off. The children, particularly the boys, reported that they felt as if their parents did not know what their children did while they were doing farmwork.

Parents' and Children's Farmwork

Although mothers reported that children can begin doing farmwork during the summers when they are 13 and

many of the younger children reported remaining at home when the parents worked, some children reported that they had worked in the fields at a very young age. For instance, one girl noted that she had worked cutting asparagus when she was 7 years old, and during the summer she helped with wheat. The boys' group in Texas reported that the youngest child that they could remember seeing in the fields was 5 years old. However, one girl said that when she was a baby, her parents would take her to the fields, and another girl reported that she started working with her parents when she was 4 years old.

All of the groups of children discussed a variety of chores they participated in with their parents. The tasks included working with crops, machinery, animals and chemicals. Tasks also included work such as fixing cars, working in the garden, and fixing the house. Work with machinery included driving tractors and loaders used for tasks such as picking up trash, cutting corn and wheat, and transporting or hauling produce. These children and adolescents also helped fix machinery when necessary.

Chemical Exposures

The children (and mothers) initially stated that they (or their children) did little or no work with chemicals. However, when the facilitator asked follow-up questions about chemicals used at work or around the house, they listed the following: bleach; acid; rat poison; and fertilizer. The facilitator asked the mothers and children if children used chemicals around their homes when they sprayed bugs or worked in the garden. With this prompting, the participants reported activities they or their children did that involved pesticides or insecticides, for example, applying fertilizers, spraying weeds, and spraying insects. When asked if children were ever around people who sprayed plants, crops, or animals, the initial negative responses changed to affirmative ones upon facilitator probing. Further, a participant answered the question "Do you ever use chemicals?" with "no" but then fully answered a related question, "O.K., what kind of clothes do you wear when you are using chemicals?", stating, "I use old clothes, bad clothes, and then I can throw them away."

The participants had some awareness of the dangers of chemical exposures. When asked if chemicals are dangerous, most reported "yes," one reported, "a little." They were aware of acute dangers, "If you spill chemicals on the table, you can get sick," and of secondary dangers, "Also, babies are known to be abnormal because of chemicals. You have to be careful around chemicals." When asked if any of the pesticides used to spray were dangerous, the responses varied from, "I have no idea" to "Yes, they are."

The farmworker children stated that they got most of their safety information from parents and school, though they did report there were biohazard signs posted on farms

where they worked. They reported that they could read labels on containers but when asked if they did, the responses were mixed.

A number of mothers and children reported that the fields were sprayed on crops such as cherries, asparagus, alfalfa, potatoes, apples, and strawberries, without giving notice. Sometimes the fields were sprayed during the weekends when the children played outside. One mother mentioned that a Washington daycare facility was close to the fields, so that the children might have been exposed to the pesticides.

Protective Clothing

The mothers reported that usually no one provided them with special clothing other than raincoats. Workers usually had to bring their own protective items (e.g., gloves), although sometimes they were "provided with special gowns." Some children reported that parents wore protective clothing in the fields, including mouth masks. When asked if the children wore them, there were mixed responses among the girls. Some of the boys reported wearing jackets, old shoes, and hats when they worked in the fields. One boy reported wearing gloves and a mask when applying chemicals.

Food and Water

The facilitator asked what fruits and vegetables the children ate, where they got them, and whether they washed them before eating them. The fruits and vegetables the participants listed included alfalfa, apples, asparagus, broccoli, brussel sprouts, carrots, cherries, cucumbers, grapes, garlic, onion, oranges, peaches, peas, potatoes, squash, strawberries, and tomatoes. They reported that they grew some fruits and vegetables in home gardens, including peaches, strawberries, and tomatoes. The participants reported they used pesticides on their home gardens. They also reported getting fruit from the farms where their relatives worked. Finally, they reported that they bought fruit and vegetables from supermarkets and country stores.

All initially reported that they washed the produce before eating it, but on further questioning acknowledged they washed the fruit only sometimes or not at all. The younger participants denied eating food while working. The older group admitted eating food from work "sometimes." In Texas, the mothers reported that the children washed their hands and fruit before eating; however, a number of children reported eating fruit from the fields without washing their hands. In both Texas and Colorado, these questions, however, seemed to make the participants uncomfortable, as if we had asked them to admit to something that was wrong.

The Texas mothers reported generally having water provided for handwashing, but not drinking. One mother reported that workers lived at a camp in California while hired to pick cherries. There was no housing provided, so workers lived in tents with no running water and no bathrooms.

Animals (Farm Animals, Pets, Fleas)

Animal work included work with cattle in Colorado. The study participants performed these activities with either parents or relatives. "I helped my dad with moving cattle sometimes, depends, and helping cows get bred." "I like to help him feed the calves, or whatever he needs, I help him." Several Texas mothers and children reported migrating with pets, some of which had been treated for fleas.

Sensitive Questions

Most mothers did not believe that questions about breastfeeding, smoking habits of their children, or lice would be offensive. The majority of women reported that they were not able to breastfeed because of work. Several children reported that they either had lice or knew of others who had. The children reported that kids start smoking from 8 to 13 years of age, and some of the boys admitted to having smoked.

DISCUSSION

In this study, focus groups were used to consider possible approaches for soliciting activities and exposures of migrant and seasonal farmworker children to pesticides. The research agenda from the US EPA Conference on Preventable Causes of Cancer in Children included the recommendation to study exposure patterns by understanding and describing the child's environment [Carroquino et al., 1998]. Focus groups are particularly useful when existing knowledge and experience is sparse or complex, and additional population-specific information is needed in order to construct or enhance a questionnaire [Powell and Single, 1996]. The focus groups in this study provided novel information in that we were trying to assess whether children could themselves report potential exposures of interest as well involving farmworkers in two areas of the country, for whom English was not often the first language. Although the Colorado and Texas focus groups were conducted independently, responses between the two sites were, in fact, quite similar although the farmworkers may have participated in different kinds of activities or the facilitators may have emphasized different areas. For example, contact with cattle and source of safety information, as described for Colorado, were not mentioned in Texas, because the Texas facilitators did not specifically elicit them.

Important highlights from the focus groups include that basic sanitation can still be a problem while in the fields; some children begin working in the fields at a very young age; spraying of fields is commonplace and sometimes when children are around; and swimming in nearby irrigation channels and playing in dirt are recreational activities of children. Further, pesticide exposure may also occur at work or at home through direct chemical or dietary sources. Overall, the participants seemed to understand the need for protective equipment (although it may not have been available or been used) to prevent exposure to pesticides and to understand the immediate dangers of exposure. However, some appeared to believe that these precautions did not apply to their activities. There was not a strong awareness of what their personal exposures were and how they may be exposed to chemicals or pesticides, e.g., driving tractors and cutting wheat and corn, or hauling produce. Examples of farm activities reported by farmworker children that might increase the chance of exposure to pesticides are shown in Table II.

There were interesting differences in reporting between the mothers and their children. For example, the mothers reported their children washed their hands and fruits/vegetables before eating more often than the children reported this. Mothers reported more organized activities like soccer and baseball whereas children reported playing in the dirt and "getting into the fields." Children also noted smoking and working in the fields at much younger ages than reported by their mothers, perhaps reflecting mothers' reporting of legal age of work rather than the age children "helped" in the fields. Some (particularly boys) believed their parents did not know what the children were doing while they were working. Other research has observed that adult surrogates are unlikely to be able to recall pesticide use or potential exposure with the same level of detail as the study subject [Blair and Zahm, 1993]. Although parents may be more knowledgeable than other surrogate responders, these reporting differences support the consideration

TABLE II. Examples of Farm Activities Reported by Farmworker Children That Might Increase Chances of Pesticide Exposure

- Playing in farming fields
- Playing in dirt near fields
- Swimming in irrigation channels
- Being outside in proximity to farming fields while fields sprayed with pesticides
- Eating fruits and vegetables without washing
- Eating food while working
- Picking crops in the field
- Driving tractors to cut wheat and corn or to pick up trash
- Spraying weeds and insects
- Helping to feed or move cattle

TABLE III. Recommendations Based on Focus Group Findings on Exposures of Migrant Farmworker Children*Activities and Exposures*

- Ask specific questions regarding mechanisms of exposure (e.g., tasks)
- Provide examples of activities that may lead to exposure in the questions (i.e.: "Do you ever drive the tractor through a field when it has just been sprayed?")
- Rephrase questions about sensitive topics (i.e.: eating food while working) so they do not sound accusatory
- Ask for detailed descriptions of the tasks performed on the farm, once those tasks have been identified

Methods of Solicitation of Information

- Avoid yes/no questions; ask open-ended questions
- Repeat the questions in different ways to prompt memories
- Perform in primary languages
- Use interviewers familiar with the local culture and migrant farmworker practices rather than external "experts"
- Ask both indirect and direct questions
- Ask older children about their own activities

of asking adolescent (or younger) children, rather than, or in addition, to their parents, about their activities.

In addition to gaining information about farm activities, the focus groups also provided guidance for the manner and form in which questions should be asked. The responses to questions related to pesticide/chemical exposures were dependent on the nature of the guided questions. For example, questions that asked, "What activities on the farm may expose you to pesticides?" or "How do people get exposed to pesticides or chemicals?", led to more productive responses than, "Do you use chemicals?", or "Are you around people who spray plants or crops?" Consistent with recommendations for conducting focus groups, questions that allow for dichotomous responses limit discussion; children, particularly teenagers, answer these type of questions quite literally [Krueger, 1994]. Probing, exploration of responses, and rewording of questions are common focus group techniques to aid in the elucidation of a topic [Patton, 1990]. Based on these focus group experiences, it was important to administer the questionnaire in the respondent's primary language. It was also beneficial to ask the same question more than once, worded slightly differently. Some participants did not realize that some of their daily activities involved chemicals until the facilitator prompted them. Also, they may not have wanted to admit their chemical use for personal reasons.

The participants often answered indirect questions about chemical use that elicited more information than the straightforward questions. Indirect questions about use such as "What clothing do you wear when applying pesticides?", was important to ask even if they had already stated they did not use chemicals. This multi-path approach to asking questions has implications as to the appropriateness of use of "logical" skip patterns in future questionnaires in this population.

Finally, the participants, both children and their mothers, indicated the appropriateness of asking potentially sensitive questions related to breastfeeding, treatment for lice, and smoking behaviors. However, care should be

taken when asking about handwashing and eating of fruits and vegetables without prior washing. There was clearly a perception that the questions were judgmental as indicated by initial discomfort with these questions, but having a local facilitator prompted forthright and more relaxed responses. Specific recommendations that may facilitate future questionnaire development are summarized in Table III.

Overall, this feasibility study demonstrated the ability to assess the activities and to evaluate the methods of eliciting information on pesticide exposure from populations of farmworker children or their mothers, which may aid in developing questionnaires for future studies. Future studies should include validation studies of exposure assessment including a more formal comparison of parents' and children's responses to questionnaire items. Migrant and seasonal farmworker children are clearly at risk of exposure to pesticides and are in need of investigation of the relation between these exposures and adverse health effects. Collectively, our work with farmworkers has demonstrated our ability to access, trace, interview, and collect meaningful information from this previously understudied population. These findings all support the feasibility of conducting future epidemiologic studies among migrant and seasonal farmworkers.

ACKNOWLEDGMENTS

The Texas authors express their appreciation to the entire staff of the Starr County Health Studies Office, La Grulla Middle School, and the study participants. The Colorado authors express their appreciation to the staff of the Salud De Valle Migrant Health Clinic in Longmont, Colorado, and to Vi Rios and Ed Hendrikson.

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