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Eye on Farmworker Health

Current Developments in Research and Policy

Female Farmworkers' Perceptions of Heat-Related Illness and Pregnancy Health

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Source: *Journal of Agromedicine (18) 4: 350-358, October 2013*

From 1992 to 2006, 16% of all occupational heat-related deaths were in agricultural work, though cases of heat-related deaths are often underreported and go unrecognized at the time of death. The study investigates the relationship between pregnancy health and heat-related illness (HRI). HRI is caused by a combination of environmental, work related and individual risk factors. Through a community-participatory study, the authors seek to document the perception of HRI in childbearing-age female fernery and nursery workers in central Florida.

"Although most workers understood that drinking water can alleviate dehydration, some reported limiting their water intake to limit their use of the restroom. Further, some workers believed that drinking cold water on a hot day causes heart palpitations, vomiting, and pneumonia."

The researchers partnered with the Farmworker Association of Florida (FWAF) to gather qualitative data. FWAF staff facilitated five focus groups with 35 farmworker women: two groups in Spanish with Latina nursery workers, another two groups in Spanish with Latina fernery workers, and one group in Haitian Creole with Haitian nursery workers. The groups were asked open-ended questions regarding pregnancy health issues and their responses were coded for analysis around four major themes: general heat-related health effects; effect of heat on pregnancy health; effect of heat on fetal health; and heat protection strategies.

Both the fernery workers and the nursery workers mentioned similar heat-related health problems, including headaches, dizziness/fainting, respiratory problems, vomiting and exacerbated high or low blood pressure. The workers also mentioned that prolonged heat exposure may lead to dehydration. However, although most workers understood that drinking water can alleviate dehydration, some reported limiting their water intake to limit their use of the restroom. Further, some workers believed that drinking cold water on a hot day causes heart palpitations, vomiting, and pneumonia. When discussing occupational health hazards with their female farmworker patients, healthcare providers should address these culturally held

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beliefs to help their patients prevent HRI and other work-related illnesses.

Farmworker responses on HRI linked pregnancy as an individual risk factor. The study participants said that heat can exacerbate a pregnant worker's pre-existing blood pressure issues. They also mentioned that pregnant workers are more easily prone to dizziness, fainting, nausea/vomiting, feverish chills, headaches, and heatstroke. Many of the workers believed that heat is deadly for the fetus because the fetus can "drown from the heat" and may suffer similar health consequences as the mother, such as dehydration. Although many initially said there was no way for workers, and particularly pregnant workers, to protect themselves from the heat, upon further reflection, some recommended hydrating frequently, wearing a brimmed straw hat, applying sunscreen, using a fan, and taking frequent breaks. Some suggested that pregnant coworkers ask to work in an area where there is less sun exposure, or that they not work at all after a particular point in their pregnancy.

The data from this study enhances knowledge and insight on how to better address heat as a specific occupational hazard for female farmworkers. The authors found that female farmworkers believe that heat exposure can adversely affect general as well as pregnancy and fetal health yet they indicate a lack of control over the conditions. Farmworkers receive no specific training about HRI, especially as it relates to pregnancy health. The authors developed HRI materials that are culturally appropriate and tailored toward expecting farmworkers.

The authors conclude their study by calling for better policy and a more advanced study on HRI and pregnancy health. Although OSHA has implemented an innovative educational campaign on HRI, mandatory uniform regulation is needed to ensure that heat protections for farmworkers are in place. Future study should explore the relationship between individual attributes, incidence of HRI symptoms, and physiological responses to heat stress to better direct HRI prevention strategies to improve the working conditions of female farmworkers.

Severe Acute Illness in a Toddler Exposed to Multiple Agricultural Pesticides and an Insect Repellent

Authors: *J.S. Sievert, B.F. Morrissey, G.M. Calvert*
Source: *Journal of Agromedicine (18) 4: 285-292, October 2013*

Healthcare providers in Washington state are required to report suspected cases of pesticide illness to the Washington State Department of Health (WDOH). From 2007-2011, WDOH received 373 cases of pesticide illness related to agricultural pesticide exposure, of which 12 cases involved farmworker children. The most notable case of severe acute illness was in June 2011 of a 17-month old toddler of farmworkers. The authors document the treatment and recovery of the child to serve as a learning opportunity for healthcare providers to better understand pesticide exposure in toddlers. They describe the medical observations, treatment and recovery of the child; the evidence gathered during follow-up investigations; and also additional information to better understand the etiology.

The healthy 17-month old boy was riding on an all-terrain vehicle with his father around a cherry orchard while eating unwashed cherries. The cherry orchard had

FARMWORKER JUSTICE

WHO ARE WE?

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It is a publication by Farmworker Justice, supported by grant number U30CS22741 from the Health Resources and Services Administration's Bureau of Primary Health Care. Each issue includes summaries of recent articles and reports, as well as recommendations for using the information to help health professionals, outreach workers, *promotores de salud*, and advocates strengthen their efforts on behalf of farmworkers and their families.

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STAY IN TOUCH

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been sprayed 48 hours earlier with pyrethoid and a fungicide. About 20 minutes later, the child became apneic and cyanotic immediately after consuming rinsed cherries from the same orchard. Thinking their son had choked on a cherry, the parents administered CPR and took the child to the hospital. A neck and chest x-ray showed no evidence of an obstruction. A toxic ingestion of organophosphate (OP) pesticide was considered but ruled out after learning from the orchardist that no OPs were sprayed on the cherries. The hospital did not conduct extensive testing for pesticide poisoning. The child was transferred to a tertiary hospital where he was observed to have miosis (pinpoint pupils) and episodes of apnea that were successfully treated with oxygen. The child was released the following day completely asymptomatic.

The study reveals that the child's case is highly complex because there are many potential sources of pesticide exposure rather than an obvious singular source. The WDOH interviewed the parents and found that the cherry orchard was not the only setting where the child was exposed to pesticides. Firstly, before the ride, the father applied concentrated mosquito repellent DEET on himself and his child. Secondly, the same day the child got sick, they visited another orchard where the pesticide lambda-cyhaolthrin and the herbicide trifloxytrobin were applied that morning. They entered the orchard during the restricted entry period. Thirdly, the father was wearing an unwashed work shirt that he had worn while chemically thinning fruit with carbaryl in an apple orchard earlier that day. Lastly, the cherries the child ate in the orchard were wiped off on the father's shirt. After the child's unwashed clothes was analyzed for pesticide traces, all these pesticides were evident.

The WDOH evaluated the plausibility of these pesticides contributing to the child's illness. They determined that carbaryl and lamda-cyhalothrinon found in both cherry orchards were the main contributors to the child's illness because they corresponded to the child's symptoms. However, the WDOH's results are limited because some samples were not collected immediately after exposure and vital samples were not collected at all, such as the father's shirt. Moreover, the authors present the possibility that the active or dormant pesticides that the child was exposed to might have interacted with each other, contributing to his illness.

The authors recommend a series of revisions in the treatment of pesticide poisoning and to the EPA's Worker Protection Standard (WPS). The authors recommend that medical staff obtain full environmental and occupational history when pediatric pesticide poisoning is suspected, including an account of possible exposures around the home and an occupational history from both parents to assess take-home exposures. Additionally, they recommend hospitals collect and freeze blood, plasma and urine samples when pesticide poisoning is suspected. Further, they recommend public health investigations of cases of acute pesticide illness to educate both the patient and physician. Finally, the authors recommend strengthening the WPS. The father of the child had received training mandated by the WPS and demonstrated some awareness of pesticide hazards but his actions in both cherry orchards showed a lack of understanding about the toxicity of pesticide residue. The authors recommend that the WPS include requirements for improved and more frequent farmworker training, better protections for farmworkers reentering contaminated fields, and more effective pesticide hazard communications.

Identification of Barriers to the Prevention and Treatment of Heat-related Illness in Latino Farmworkers using Activity-oriented, Participatory Rural Appraisal Focus Group Methods

Authors: *M. Lam., J. Krenz, P. Palmandez, M. Negrete, M. Perla, H. Murphy-Robinson, J.T. Spector.*
Source: *BMC Public Health 13 (1004), October 2013*

Agricultural workers have the highest heat fatality rate in the labor sector. There have been efforts to lower the heat fatality rate by educating farmworkers on heat-related illness (HRI) prevention and treatment. Yet, many farmworkers reject such taught practices. Little is known about the barriers that hinder the acceptance of HRI prevention practices by farmworkers. The authors seek to identify these barriers to HRI prevention and treatment through a qualitative study of Latino farmworkers in Washington state.

A total of 35 workers from Central Washington state – 21 men and 14 women – participated in the study. The participants were placed into three focus groups by crop: blueberry workers (n=11), peach workers (n=12), and apple and cherry workers (n=12). The focus groups were conducted in Spanish using the PRA method, an interactive approach that engages farmworkers through visuals, games, and storytelling while the facilitator records his or her observations and responses to questions. The semi-structured questions touched on the knowledge and practices related to HRI symptoms, risks, treatments, prevention, and hydration.

"Some participants believed that headaches, fainting, arthritis and oral blisters may be caused by exposure to cold immediately after heat. Also, many of the female workers suspected that water located near the bathroom was contaminated. They preferred water with a clean appearance when deciding whether or not to drink water provided at work."

Although only two participants reported having previously received formal HRI training, the majority were well-aware of the symptoms and causes of HRI as well as practices to prevent HRI. Yet they did not necessarily adopt preventative practices. For example, participants reported that wearing dark or tight clothing can cause HRI; however, the workers reported wearing dark clothes due to unavailability of cool protective clothing, the desire to lose weight, or to prevent UV exposure that may result in a sunburn and darker skin. Similarly, they knew that water was the healthiest option for hydration; however, the participants' answers suggest that they may not be drinking enough water to stay adequately hydrated. Instead, many reported drinking energy drinks to increase alertness and productivity.

The authors identify potential barriers to HRI treatment and prevention including cultural attitudes and beliefs, competing health priorities, workplace factors, and a perceived inability to control HRI risk factors. For example, some participants believed that headaches, fainting, arthritis and oral blisters may be caused by exposure to cold immediately after heat. This belief could lead to less effective heat stroke treatment, which involves rapid cooling and reduction of core body temperature. Also, many of the female workers suspected that water located near

the bathroom was contaminated. They preferred water with a clean appearance when deciding whether or not to drink water provided at work. The authors write that this preference is consistent with other studies of Latino farmworkers who indicate that they do not trust water provided in opaque containers.

The authors acknowledge several limitations of the study. The sample of participants, half of whom reported living in the U.S. for over 10 years, may be more acculturated than farmworkers who recently arrived in the U.S., limiting the scope of the findings. Further, the focus group discussions included sections of HRI education, potentially leading to bias in participant responses. However, the authors provided the educational exercises after participant comments about HRI topics. Finally, the authors did not examine the underlying reasons for the participants' beliefs nor did they quantify participants' responses; the responses were subjective rather than objective.

The authors recommend a series of proposals to overcome the identified barriers:

- Employer engagement in the development of HRI interventions. Such interventions include moving the location of water away from the restrooms but near workers in non-opaque containers. Engaging with employers in the discussion and development of HRI interventions is likely to increase its effectiveness.
- Educational trainings that address HRI prevention topics in a culturally competent manner. The training should include the role of cultural beliefs in the prevention and treatment of HRI; recommendations to identify and acknowledge cultural beliefs in a non-judgmental and respectful manner; and recommendations to include workers in the development of effective and culturally acceptable strategies for HRI treatment.
- Enhanced UV protection of clothing through frequent laundering with ultraviolet absorbent agents. The authors also recommend the use of clothing with pre-integrated UV protection.
- Participation in health promotion activities, such as community-based obesity prevention and fitness programs.

Further study is needed to gain a better understanding of HRI-relevant knowledge-behavior gaps among farmworkers that may lead to the development of additional strategies for HRI prevention.

Beliefs of Science Educators Who Teach Pesticide Risk to Farmworkers

Authors: *C. LePrevost, M.R. Blanchard, W. G. Cope*
Source: *International Journal of Environmental & Science Education 8:587-609, June 2013*

Many farmworkers receive pesticide education through informal science educators, such as health workers, advocates, state agency educators, or cooperative extension/university educators. However, little is known about the beliefs of these educators and how their beliefs about teaching, pesticide risk, and self-efficacy may influence their practices when informally educating farmworkers. The authors seek to identify the factors that influence the educators' beliefs and the role of these factors in pesticide education.

Current literature states that three mutual factors influence an educator's beliefs: personal (self-image and belief about teaching and pesticide risk), behavioral (teaching practices), and environmental (teaching setting and perception of farmworkers as learners). The authors use this understanding as a framework for their study. They ask: What are the educator's beliefs on teaching, pesticide risk, and self-efficacy? What factors determine their beliefs?

The authors use both qualitative and quantitative methods to create a descriptive study. They conducted semi-structured interviews by phone and in-person of 19 educators in a Southeastern state. Participants were asked demographic questions related to gender, country of origin, ethnicity and Spanish proficiency and also questions about their experiences handling pesticides and in farmworker pesticide education. Additionally, participants were asked to fill out a Pesticide Risk Beliefs Inventory (PRiBI) and Science Teaching Efficacy Beliefs Instrument (STEBI) questionnaire. PRiBI measured the extent of the individual beliefs about pesticide risks and hazards while the STEBI assessed the efficacy of the educators compared to middle school science teachers. Field notes on interactions with participants were also analyzed to enhance the authors' understanding.

The authors distinguished between health care workers and advocates (Group A), and state agency and cooperative extension/university educators (Group B). These two groups of educators are different in a number of ways, including teaching experience, experience in pesticide application, and beliefs about pesticide risk. Group B educators delivered only an average of three to five lessons a year while Group A educators delivered up to 500 pesticide lessons a year. Also, Group B educators had experience loading, mixing and applying pesticides. An educator's experience in pesticide application is deemed a "critical episode" because it shapes the educator's beliefs about pesticide risk. Compared to health care workers and advocates (with little or no experience handling pesticides), the educators from state agencies and cooperative extensions were less cautious assessing pesticide risk.

These differences between the two groups of educators extend to their teaching beliefs, self-efficacy rates, and demographics. Advocates and health care workers were learner-centered (56%), incorporating the farmworkers into the development of the lesson. State agency and cooperative extension/university educators, on the other hand, were teacher-centered (60%), placing greater importance on participant attentiveness. Some other distinctions between both groups included ethnicity, education and Spanish proficiency. Health care and advocacy educators were proficient in Spanish (89%), majority female (89%), and had a Bachelor's or lesser degree (100%). On the other hand, cooperative extension/university and state agency educators were predominantly European American (90%), had a graduate degree (70%) and had limited Spanish proficiency (60%) that required the use of an interpreter to facilitate discussion among farmworkers.

The authors believe that the findings of the study, though it focused on pesticide education, have implications for other formal and informal science educators. Their conclusions are threefold: 1) not all authentic science experiences may have a positive effect on science teaching; 2) teaching beliefs varied by institutional affiliation; and 3) the self-efficacy of informal educators was lower, in some cases much lower, than that of experienced classroom teachers. The authors recommend

a follow-up study using a broader sample and moving away from self-reported data in order to further understand and improve pesticide education.

POLICY UPDATE: REVISIONS TO THE EPA'S WORKER PROTECTION STANDARD

The EPA recently published proposed revisions to the Worker Protection Standard (WPS) in the Federal Register and opened a formal public comment period until Jun 17, 2014. The WPS provides basic protections to farmworkers to minimize the adverse effects of pesticide exposure. The law applies to both workers involved in the production of crops and "handlers" who mix, load, or apply pesticides. Among the law's requirements, agricultural employers must: provide pesticide safety trainin to workers, provide protective equipment to workers coming into contact with pesticides, and restrict entry into pesticide-treated areas until deemed safe.

The EPA's revisions represent the first major overhaul of the WPS in 20 years. The proposed changes include several provisions that could have profound effects on the health of farmworkers and their families, including:

- more frequent and improved content of worker safety training
- a minimum age of 16 for pesticide handlers and early-entry workers
- respirator use training and fit-testing for pesticide handlers
- new requirements for emergency medical assistance

The EPA also requests input on safety measures it considered but decided not to include in the regulation, including:

- medical (cholinesterase) monitoring of workers who handle organophosphate and carbamate pesticides
- a minimum age of 18 for pesticide handlers and early-entry workers
- on-site showers for decontamination of pesticide handlers

Farmworker Justice encourages health center clinicians and outreach workers, farmworker health researchers, and others with specialized knowledge about farmworkers and pesticide exposures to provide comments on the EPA's revisions. Such input from the public will help the EPA to determine which provisions it will include in the final regulation. The public comment period closes on June 17, 2014. The Migrant Clinicians Network (MCN) also has useful information and comments specific to the WPS for clinicians. For more information about the WPS, the proposed changes, and how to submit comments, please visit the FJ website, MCN's WPS page, or contact Virginia Ruiz at vruiz@farmworkerjustice.org.

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