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EMPOWERING LATINO YOUTH FARMWORKERS AS YOUTH HEALTH EDUCATORS FOR OCCUPATIONAL HEAT-RELATED ILLNESS SAFETY EDUCATION IN EASTERN NORTH CAROLINA

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Introduction

> When we go into the fields, it's really hot because the tobacco plants are very tall. It's difficult to breathe. We have to drink water after we finish one row of tobacco or after an hour or two depending on how high the tobacco plants are. I know I have to rest when my head starts to hurt. I drink a lot of water but, when I do, my stomach hurts, and sometimes I get nauseated. I sweat a lot. Today, I only lasted a few hours in the heat. You can't work [in that heat]. [There was a heat index of 104 at noon that day.]
>
> — Norberto, age 14, personal communication

Incorporating youth into health education development, implementation, and evaluation processes for occupational health education has great potential. Empowering youth and communities to be a part of their health education serves to increase the utility and long-term impacts of health education initiatives among underserved, vulnerable communities. In rural North Carolina, many youth are working in the fields to provide income for themselves or their families, yet this is extremely dangerous work that can result in serious health issues.

This paper describes a Youth Health Educator program (YHE) that provided youth farmworkers between the ages of 10–21 with the opportunity to protect the health and well-being of their community and themselves. This program provided youth the opportunity to gain skills in leadership, managing group dynamics, and public speaking, which help to build character as well as a sense of usefulness, belonging, and power. As applied anthropologists engaged in public and occupational health research and co-developers of this program, we were able to understand the daily situation youth farmworkers confront and,

simultaneously, provide an avenue of change and advocacy to protect their health and build their personal capacity and leadership.

To protect youth from one of the most serious dangers, which is that of over-heating, we joined with a North Carolina community-based organization to create a youth-led intervention to protect youth and adult farmworkers from heat stress. The foremost lesson learned from this program was that farmworker youth were able to master the education program content and provide a quality educational experience that resulted in greater knowledge of heat-related illness among their peers. Second, as applied anthropologists working with and providing interventions for vulnerable populations, we discovered that we must integrate anthropological methods into organizational goals to develop the best strategies for promoting health behavior change as well as fostering empowerment.

The Farmworker Population

Farmworkers constitute a vulnerable and marginalized population in the United States that endures occupational hazards, economic hardships, and has limited access to healthcare (Arcury and Quandt 2007). While a large percentage of farmworkers in North Carolina are undocumented, an exact percentage is unknown. Their immigration status greatly affects their access to health-care, as they are limited to only using migrant clinics and emergency departments. Over a million farmworkers are employed in the United States (Kandel 2008), with about 150,000 working in North Carolina. An estimated 200,000–400,000 farmworkers who are Latino youth (under 18 years of age) work in the United States (Human Rights Watch 2010). Farmworkers are overwhelmingly Latino immigrants from Mexico who have limited formal education and low incomes. They and their families suffer many health disparities, and they are marginalized due to language, income, education, and, for some, legal status (Arcury and Quandt 2007).

Youth farmworkers and youth in farmworker communities are extremely vulnerable. They often lack support for positive experiences to promote healthy development and are located near risk-promoting factors that can influence their behavior and attitudes. These influences can result in feelings of hopelessness and powerlessness (Berg, Coman, and Schensul 2009). Lacking federal regulations, many youth farmworkers work 10–12 hours each day during the summer and often work before and after school and on weekends during the school year. Some youth easily exceed 60 hours of work per week. As with their adult counterparts, youth farmworkers often receive less than the minimum wage and encounter the same occupational health risks, including that of heat-related illness (Cooper et al. 2006).

Youth in poor and marginalized communities also assume adult roles as wage earners, child care providers, and as translators and negotiators in medical and social services for parents. Due to the need for child care or added family income, some children, between the ages of five and nine, accompany their parents into the agricultural fields. Farmworker youth, ages 10–15, often feel pressure to work in the fields and support the family (Human Rights Watch 2010). However, the majority of youth farmworkers are “emancipated youth” who migrate and work independently of their parents (Peoples et al. 2010). Many farmworker youth have little opportunity for healthy, positive development during adolescence (United States DHHS

2007). Providing youth with positive development through leadership roles, experiential education, and skill-building activities helps them avoid self-destructive behaviors such as violence, drug abuse, and gang participation (OSG et al. 2001). Investing in youth as conduits for individual and community change is successful in promoting positive individual behavior change and development of important life skills (Berg, Coman, and Schensul 2009).

Youth Farmworkers and Heat-Related Illness

Heat-related illness is an important occupational health risk for farmworkers (Culp et al. 2011). Heat-related illness is brought on by hyperthermia, or high body temperature, which is the result of increased sweating and circulatory demands when the body fails to remove heat gained from the environment. Prolonged muscular activity further increases metabolic rate, causing the inner body temperature to rise. Symptoms include rash, irritability, fatigue, light-headedness, headache, thirst, nausea, muscle cramps, edema, hyperventilation, fainting, rapid heartbeat, delirium, organ failure, seizure, coma, and death. In 2006, farmworkers experienced death due to heat-related illness at a rate 20 times that of the general population (May 2009). Youth are at greater risk of heat-related illness than are adults. Those younger than age 14 experience death due to heat-related illness more frequently than those aged between 15 and 64. Age-related variations in pre-pubescent children's thermoregulatory systems and capacity for self-health management inhibit their abilities to cope with extreme temperatures (Sanchez et al. 2010). Consequently, youth farmworkers, who spend large amounts of time working in extreme heat, are at even higher risk of heat-related illness than are their adult counterparts.

Heat-related illness can be prevented through purposeful hydration (at the rate of half a liter of water every 30 minutes) and deliberate cooling of the body (e.g., resting in shade or air-conditioned areas) (Culp et al. 2011). Wearing lightweight, loose fitting, light colored clothing and hats can also deter overheating. However, although agricultural employers are required to provide farmworkers with access to potable water, they are not required to provide shade or air conditioning, adequate time for cooling, or proper clothing and hats (AFOP 2007). Most farmworker safety education targets adults, with child education focusing on recreational heat stress (e.g., Nemours Foundation 2013; OSHA 2013). Without proper safety information specific to Latino children and youth, this population is at risk for occupational injuries. Culturally tailored Spanish-language heat-related illness education and intervention for Latino youth farmworkers is needed (Culp et al. 2011).

Youth Health Educators and Heat-Related Illness

Ongoing collaboration between our two organizations, the Wake Forest School of Medicine, and NC FIELD, Inc., which is an organization dedicated to education and leadership development among youth (ages 10–21 years) from farmworker families, ignited the idea of empowering youth as change agents for health in their community. Wanting to respond to the needs of Latino youth farmworkers and those who accompany their parents into the fields, we developed a culturally and occupationally appropriate educational program to be delivered by youth health educators (YHEs) to youth and adults. Having the youth, as

insiders, provide the program enabled healthy behavior change and empowerment through one intervention. The educational program was effective in educating Latino farm-worker youth about the risks, symptoms, and treatments for heat-related illness.

Operating under a university-community partnership utilizing participatory action research (PAR), our team emphasized the importance of community participation at each step in the process. Our project had three features: (1) participation of farmworker youth, (2) action taken on a well-identified problem in the farmworker community, and (3) research that identified and created the heat stress educational program for Latino youth. The knowledge and resources in the hands of the YHE were powerful indicators of empowerment that created positive health behavior change within a vulnerable community taught by the community members. Participatory action research is essential in addressing health disparities, attacking structural limitations that marginalized youth face, and providing a path to empowerment and change at the individual, community, and structural levels (Berg, Coman, and Schensul 2009). The Wake Forest Health Sciences Institutional Review Board reviewed and approved the study protocol. All participants in the program implementation and evaluation of the program provided verbal informed consent.

YHE Program Development

YHE Program Development included: (1) designing the educational program, (2) implementing the program, and (3) evaluating the program. Designing the educational program began with a review of heat-related illness educational materials available for the public and occupational groups, especially those that focused on youth and farmworkers. No educational materials that addressed the particular needs of youth farmworkers were located. Two focus groups were conducted with 24 youth farmworkers, ages 11–21 years. These focus groups explored topics related to heat-related illness, farm work, and the possibility of having YHEs teach their peers and adults. Analysis of the focus groups included a review of audio recordings and notes taken during the discussions. Youth farmworkers revealed that a YHE program would be a useful and proactive approach for engaging youth and adults in heat-related illness prevention. The focus group data also provided key insights about the beliefs and understanding of heat related-illness held by youth farmworkers that could be addressed by the educational curriculum.

The design of the educational materials was based on the review of existing educational materials and the analysis of the focus group data. These sources suggested that a flip chart format provided a functional, easy to transport, and graphic-based medium that could be easily presented in English or Spanish. Program curriculum development began by outlining the topics that the program should address, including defining heat-related illness and describing its symptoms, suggesting methods for prevention, and outlining treatment and emergency actions when heat-related illness was encountered. The information contained in the curriculum was formulated in consultation with an expert in the field of occupational heat-related illness prevention and treatment.

The final program included: (1) YHE training program curriculum, (2) “The Deadly Heat/El Calor Mortal” flip chart with an incorporated educational script (Figure 1), (3) educational

game materials ("The Cabbage Game") to reinforce program messages, and (4) a brochure to facilitate program information recall in the field. Electronic copies of these materials are available from the authors. All program materials were drafted in English and then translated into Spanish by a native Spanish speaker. The materials were then back-translated into English by a native English speaker. All final project materials were provided in English and Spanish.

A pilot test of the program was completed with seven youth farm-workers and two adult leaders from NC FIELD. Participants in the pilot program requested that the session be conducted in English. The results of the pilot test provided insights for improving the health educator training program.

Implementation

Program implementation began in June 2012 with training of the NC FIELD leadership and youth farmworkers employed for the season as YHEs (Figure 2). Seven farmworker youth aged 14–20 years were trained; they included four girls and three boys. One of the seven YHEs was trained as an alternate in case one of the other six left the program. This proved wise; one of the YHEs migrated to work in a different location soon after the training. All of the YHEs were active members of NC FIELD and current or former youth farmworkers.

The YHEs and adult facilitators from NC FIELD were responsible for recruitment and training of farmworker youth ages 11–21 years from June through October 2012. The goal was to train 200 youth. The YHEs recruited participants through family, friends, churches, and neighbors. Educational sessions were held on weekends at YHEs' homes, the homes of participants, or public locations, such as libraries or parks. Transportation and logistical planning often proved difficult. Collapsible water bottles and cooling cloths were distributed to participants to reinforce the educational program.

Evaluation

Program evaluation included journals written by YHEs during implementation, pretests and posttests for participants at every session, observation, and team discussions. Ongoing process evaluation was facilitated by regular meetings between Wake Forest School of Medicine and NC FIELD investigators. In addition, two meetings that included the YHEs, as well as the NC FIELD and Wake Forest Investigators, allowed for program monitoring and revision and collection of insights regarding the data collection process (challenges and progress) and the educational program (strengths and weaknesses).

Results

The YHEs reported that the program content was relevant and that the flip chart's provocative pictures and repetition of information helped the participants retain information. They found that participants were eager and thankful to learn the material. One YHE shared the impression the education program made on her participants in her YHE journal:

> Participants often had shocked reactions. “I’m glad you’re telling me this.” These siblings were aware of dehydration and that by drinking water it could be avoided. They did not know how much water to drink, amount of nicotine absorbed by the body, etc.
>
> (Yesenia, age 20, personal communication)

One of the most difficult aspects for the YHEs was to find time between their work, family life, and other NC FIELD-related activities to present the program. However, several of them grew to be strong recruiters and helped the rest of the YHEs locate participants. As more people learned about the project, they were excited to participate:

> I’m trying to find kids with families, and somehow they are hearing about this research. Awesome! I’m heading out, and I usually see friends coming with brothers, sisters, cousins, etc., and they are coming to my house, wanting to know more! Let me keep up the work.
>
> (Neftali, age 17, personal communication)

The YHEs shared their difficulties as well as their successes and positive reactions. They admitted they were nervous to stand and present in front of others and worried about what others would think of them. One YHE wrote, “I am becoming more comfortable with public speaking…to kids” (Yesenia). Another stated that in the first educational session he was shaking and had to focus in order to get through the material; however, as time went on, he felt more confident and was actually excited about presenting the materials. After he shared this experience, the other YHEs agreed that they felt much more confident about public speaking. Having to do the presentation repeatedly helped to make them secure in the material and have confidence presenting the information.

The YHEs shared that one of their most important lessons was learning how to prevent and recognize heat stress. This knowledge empowered them to protect themselves and others. The YHEs believed audiences learned from the lesson, and the YHEs noticed a difference between the pretest and post-test scores and in how long participants took to complete the tests. Participants and YHEs enjoyed the cabbage game and said it was a great way to review the material. Providing all of the materials in both Spanish and English was extremely useful as participants varied in their language preference.

Ultimately, 147 farmworker youth participated in the formal educational program. Pretests and posttests were scored with a maximum score 10 for all correct answers. Analysis demonstrated that the educational program increased participants’ scores by just under four points ($p<0.0001$; see Table 1). This suggests the educational program was an effective means to increase participants’ knowledge of heat-related illness.

Discussion and Conclusions

Our program documented that youth can be the conduit for change in their communities’ health by providing quality educational experiences. The project resulted in greater knowledge of heat-related illness among youth farmworkers in eastern North Carolina. The YHEs, though having some uncertainty at the start of the project, expressed their

significantly increased confidence and comfort with acting in such a capacity by the project's end. They also expressed appreciation for having learned about the topic, as they often work as farmworkers during the summer months as well.

Other lessons learned that will affect the future development of the YHE program are:

- The geographical dispersion of the YHEs and participants proved to be a challenge for the YHEs and NC FIELD adult facilitators, which resulted in reduced recruitment. Future programs should establish clearer plans for geographically efficient and systematic participant recruitment with the presentation of the program to larger groups.
- The engagement of the YHEs in multiple projects through NC FIELD, Inc., limited the time and energy they had available to devote to this education project.
- NC FIELD did not have adequate staffing to support the logistical execution of the program sufficiently; all of the adult facilitators from NC FIELD were responsible for several projects.
- The number of youth farmworkers who were available to participate early in the season was less than in previous years, and it was difficult to recruit participants when they did arrive for the harvest.

> "…youth can be the conduit for change in their communities' health by providing quality educational experiences. … applied anthropologists working in occupational health are particularly well suited to provide insight and understanding to health intervention programs for vulnerable populations."

Future research should explore the range of appropriate applications for such a model and assess the actual long-term impacts of such education programs for the target communities and youth health educators.

This project shows that applied anthropologists working in occupational health are particularly well suited to provide insight and understanding to health intervention programs for vulnerable populations. Yet, it is vital to balance the strategy of health behavior change with empowerment and capacity building. Rather than forcing change from the outside, we can encourage worker communities to take control of the knowledge and capacity to produce healthier outcomes for themselves and their communities. They will become more empowered and, therefore, more able to lead healthier lives at a higher quality of life.

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Biographies

Chaya R. Spears (cspears@wakehealth.edu) is a research instructor in the Department of Family and Community Medicine and a member of the Center for Worker Health at Wake Forest School of Medicine. She is an applied medical anthropologist whose most recent research has focused on participatory research and planning methods, Latino farmworker occupational health, and scientific integrity in community-based participatory health research. In all aspects of her work, she emphasizes the role of anthropological research methods and theoretical insight in the development of socially just, practically relevant, and sustainable positive sociopolitical change.

Anne E. KraemerDiaz (akraemer@wakehealth.edu) is a project coordinator in the Department of Family and Community Medicine, Wake Forest School of Medicine. She obtained her master's degree in anthropology from the University of Kansas, where she is currently completing her doctorate in anthropology. Her research interests include the social determinants of health, chronic disease prevention, environmental and social justice related to health, and community-based participatory research.

Melissa Bailey (executivedirector@ncfield.org) is originally from a small coal mining community in Logan County, West Virginia. She has spent more than a decade dedicated to the education of migrant farmworker families and unaccompanied youth. She is bilingual and culturally proficient, a certified non-profit manager, and a dropout prevention curriculum trainer. Melissa is an experienced community organizer with project management skills and a demonstrated history of community building, fundraising, and resource allocation on behalf of farm-worker children. She is the Executive Director of NC FIELD.

Kevin King (kking@uncaa.unc.edu) is an athletic trainer for Campus Health Services and the Department of Athletics at the University of North Carolina at Chapel Hill. Since 2000, he has worked with numerous high school, collegiate, and professional athletes and patients in an effort to prevent, recognize, treat, and rehabilitate injuries and dysfunction. While at the University of Connecticut and the University of North Carolina at Chapel Hill, he has

contributed to research in the area of heat illness in activity populations and hydration practices.

Thomas A. Arcury (tarcury@wakehealth.edu) is Professor and Vice Chair for Research, Department of Family and Community Medicine, and Director, Center for Worker Health, Wake Forest School of Medicine. Since 1996, he has collaborated in a program of community-based participatory research with immigrant farmworkers, poultry processing workers, and construction workers focused on occupational health and justice. He has authored numerous refereed articles, and he is the co-editor of a volume on the health, safety, and justice of farmworkers. He has participated in the development of educational materials intended to return research results to immigrant workers. He has also used research results to affect policy change.

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Figure 1.
Cover of Heat-Related Illness Educational Flip Chart

Figure 2.
Youth Health Educator Neftali Demonstrating the Heat-Related Illness Educational Flip Chart

Table 1.

Paired T-test Results for Pretests and Posttests of “The Deadly Heat/El Calor Mortal” Heat-Related Illness Youth Health Education Program (N=147)

	Pretest	Posttest
Mean	5.34	9.00
Variance	4.56	2.20
p<0.001		

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