

Development of a Work Stress Survey for Farmworkers

OBJECTIVE AND SPECIFIC AIMS

Agricultural families are at a heightened risk for adverse health effects due to a variety of factors, including exposure to chemicals, impoverished environment, poor nutrition, and limited access to medical care. Children of agricultural workers show deficits in cognitive function, growth and development, and neurobehavioral performance as compared to nonagricultural children. Adding to these problems, workers in jobs, such as agriculture, with high demands and low control (viz., long work days, low income, low job security) exhibit physiological responses to work stressors. Further, children's reaction to stress is correlated with their parents' psychological stress. The goal of this pilot project is to develop methods to assess workplace stress in agricultural families and to identify stressors faced by agricultural families.

This project builds upon the work begun in the PNASH project "Neurobehavioral Assessment of Pesticide Exposure in Children" which established relationships within an agricultural community, built a cohort of 300 agricultural families and controls living in the same community, and assessed their demographic and occupational characteristics. This project will focus on two specific aims to develop a culturally appropriate questionnaire to evaluate workplace stress in agricultural workers drawn from the cohort.

Aim 1: Development of a Stress Questionnaire. A questionnaire to evaluate work and life stressors in agricultural workers will be developed and pilot tested.

Aim 2: Validation of the Stress Questionnaire. The validity of the Workplace Stress Questionnaire and questionnaires addressing lifestyle factors of stress will be evaluated in a group of Latino agricultural workers. One hundred participants will complete the questionnaires at times of low work demand (pruning; February-April) and high work demand (harvest; August-September).

BACKGROUND AND SIGNIFICANCE

Immigrant workers are a rapidly growing part of the US work force. They tend to work in high-risk and low-paying occupations including agriculture, construction, and as day laborers (McCauley 2005). In 2004, thirty percent of all agricultural workers in the US were Mexican immigrants, although this number is significantly higher in some states (Villarejo et al., 2010). Agriculture is considered one of the most hazardous occupations, and agricultural workers are at increased risk for both fatal and non-fatal injuries. Although recent NIOSH reports indicate that farm-related injuries and fatalities are declining, there has been an increase in stress-related behavioral health problems including suicide, depression, and substance abuse (Rosmann 2010).

Lifestyle Factors Impacting Health

Agricultural workers and their families are at a heightened risk for adverse health effects due to a variety of factors. Seventy percent of agricultural workers report having no health insurance (Villarejo et al. 2010), and Latino children experience an unequal burden of health risk factors, e.g., limited access to health care, underutilization of services, and suboptimal health status (Flores and Tomany-Korman 2008). Often, these factors are related to language barriers, lack of transportation, and a lack of familiarity with the healthcare system and services available (Arcury and Quandt 2007). Thirty percent of these families live below the federal poverty level, reporting food insecurity (64%) and hunger (35%) (Borre et al. 2010; Carroll et al. 2005), which have been

associated with poorer health including depression, gastrointestinal symptoms, and learning disorders (Weigel et al. 2007). Lifestyle and work factors often lead to a greater reliance on prepared food, increased snacking, and dining out at fast food restaurants, one report found 89% of farmworkers consume inadequate amounts of fruits and vegetables (Kowalski et al. 1999). Moreover, these factors can lead to obesity, raising concerns in agricultural workers who know obesity-related illnesses can prevent a worker from being able to work and support their family (Borre et al. 2010).

Workplace Stressors

Workers face a number of stressors on the job that affect their performance at work, their relationships at home, their safety, and also their physical and mental health. Examples of psychosocial work stressors include role conflict, physical demands, and schedule inflexibility (Andries et al. 1996; Frone et al. 1997; Neal and Hammer 2007). Family stressors that have been linked with negative outcomes include time commitment, parental demands, and eldercare demands (Luk and Shaffer 2005; Neal and Hammer 2007). Greater demands are placed on employees to balance the demands of both work and family. Factors such as job flexibility, job control and job demands all play a role in successful management of these responsibilities.

Migrant and seasonal farmworkers report high levels of stress related to mobility, language barriers, job security, financial concerns, and long workdays (Hiott et al. 2008; Kim-Godwin and Bechtel 2004) that can vary across season (Grzywacz et al. 2010). Due to the seasonal nature of agriculture, workers often experience periods of unemployment or job insecurity. Self-reports of poor physical health are associated with physical job demands requiring awkward postures; self-reports of better health are associated with increased job control (Grzywacz et al. 2008).

Occupational injuries and agrochemical exposures are also a concern. Agricultural workers experience a number of occupation-related injuries, most frequently musculo-skeletal injuries followed by skin injuries (Anthony et al 2009). Another occupational risk of agricultural work is pesticide exposure. In the 1990s some 2.5 million to 5.0 million agricultural workers were exposed to organophosphorus (OP) insecticidal pesticides in the United States (Das et al. 2001). Agricultural workers and their families have a higher risk of exposure to pesticides compared to the general population due to the close proximity of their homes to fields where pesticides are applied, as well from take-home exposure (Lu et al. 2000; Quandt et al. 2004). Recent research has demonstrated that OP exposure interferes with metabolism, leading to obesity and diabetes in rat models (Lassiter and Brimijoin 2008).

Previous Research

This project builds upon the work begun in the PNASH project “Neurobehavioral Assessment of Pesticide Exposure in Children” which established a cohort of 300 agricultural and control families living in the same community. Parents and children were interviewed, home dust samples were collected to measure pesticide residues and a neurobehavioral battery was administered to the children two times, 1 year apart. As part of a community-based survey, agricultural workers were asked why they work in agriculture. Specifically, Latino workers (n=65) reported that even though they are qualified for other jobs (61%), agriculture was the only job they could find (61%), likely due to most of their family also working in agriculture (69%). Further, more than half of the Latino workers reported that they did not like the lifestyle associated with their work (55%). As part of the 2010 Oregon Health Study, Providence Hospital surveyed 273

community members in Hood River (Allen et al. 2010). A greater portion of the Latino participants (n=70) report being uninsured in the past six months (45%), than the non-Latino participants (15%; unpublished data). Moreover, Latino workers report more days of “not good” physical and mental health (5.0 and 4.7 respectively) in the past month, than their non-Latino counterparts (3.7 and 3.4). Although agricultural activities in the region occur throughout the year, certain times have higher levels of activity. Employment records show the lowest number of agricultural workers in the first two quarters of the year followed by a 42% increase during harvest time (OR Employment Department; www.qualityinfo.org).

Significance

It is clear that stress is associated with agricultural work and there is evidence that Latino workers may bear a heavy burden of stress. The aims of this project are to: 1) develop culturally appropriate methods to assess workplace stress in agricultural workers and 2) to evaluate the questionnaires by comparing stress in agricultural workers at high work demand and low work demand times. The proposed research project will contribute to our understanding of the role occupational stress has on the health and well being of agricultural workers and their families, directly addressing the strategic goals of the National Occupational Research Agenda (NORA). Information about the health, safety and wellness (surveillance), of Latino agriculture workers and their families (vulnerable populations), will be collected in this project through questionnaires administered to agricultural workers.

RESEARCH PLAN

Participants

Latino agricultural workers will be recruited for the study. Recruitment will begin with workers who participated in the previous PNASH project. Additional participants will be recruited using the previous, successful recruiting methods as needed. Participants will be recruited to participate in focus groups, interviews and pilot testing during the development of the questionnaire items and then a cohort of 100 participants will participate in the Evaluation Study.

Aim 1: Development of a Stress Questionnaire. A questionnaire to evaluate work and life stressors in agricultural workers will be developed and pilot tested.

In order to identify and characterize the workplace stressors faced by agricultural workers, questionnaire items will include: work history, job strain (Karasek et al. 1998), work-family stress (Netemeyer et al. 1996), supervisor support (Hammer et al. 2009), and safety outcomes (Griffin and Neal 2000; Hemingway and Smith 1999). In addition questionnaires addressing lifestyle factors associated with stress will also be evaluated, including: sleep (Buysse et al. 1988); diet/nutrition (Thompson et al. 2002); acculturation (Hovey and Magaña 2000); psychological factors (Boiko et al. 2005; Kessler et al. 2002; Mroczek and Kolarz 1998). Several of these questionnaires have been adapted for use with agricultural workers, other standardized questionnaires will be reviewed and pilot-tested to determine the appropriateness for this population. Because work stress leads to increased abuse at home (i.e., domestic violence), a standardized domestic abuse survey will be administered to participants to examine the association between levels of stress and domestic abuse.

The first step will be to review data from the current PNASH project that addresses these

factors. During the follow-up session with the families in the second year, a questionnaire was administered that included a standardized measure of work-family balance (Netemeyer et al., 1996) as well as employment history and questions addressing stress and child care throughout the year. A preliminary review of the data indicates that parents had difficulty with the standardized work-family questionnaire indicating that the concept of work-family stress may be viewed differently in agricultural workers. Anecdotal evidence from our families and members of our advisory board indicate that stress in agricultural workers is more likely to be associated with periods of low work demand and with the concern of unemployment, than with periods of high work demand. Data from other questionnaires that were administered will also be analyzed to identify workplace and lifestyle stressors (Agricultural Work Practices, Pesticide Use, Acculturation Scales, and the Life History Questionnaire).

The next step will be to review questionnaires administered as part of other research projects including the Idaho Partnership for Hispanic Health, the Migrant Farmworker Stress Inventory (Hovey), the National Agricultural Workers Survey, along with traditional workplace measures, e.g., job strain (Karasek et al., 1998), work-family stress (Netemeyer et al., 1996), supervisor support (Hammer et al., 2009) and safety outcomes (Griffin and Neal, 2000; Hemingway and Smith, 1999). Consultation with researchers (L. Hammer) and community health care providers will aid in the development of items to characterize stress in Latino agricultural workers. Focus groups and interviews with agricultural workers and other stakeholders will further develop questionnaire items.

Throughout the development of the questionnaire agricultural workers will be recruited to review the items through interviews and pilot testing. A strategy of pilot-revise-pilot will be implemented until items are developed that address the concerns of Latino agricultural workers and are presented in a format that is understandable to the workers. Various formats to present the questions will be examined. During the administration of the work-family questionnaire in the current project it was noticed that participants would often answer yes or no to questions of work stress instead of providing an answer along a Likert-type scale which indicates the intensity of their feelings. This was found even though the questionnaire was administered orally and the Research Assistant would probe for a different response. Different response formats and presentation methods will be evaluated through pilot testing. Test-retest reliability will be assessed as part of this aim.

Aim 2: Validation of the Stress Questionnaire. The validity of the Workplace Stress Questionnaire and questionnaires addressing lifestyle factors of stress will be evaluated in a group of Latino agricultural workers. One hundred participants will complete the questionnaires at times of low work demand (pruning; February-April) and high work demand (harvest; August-September).

After pilot testing of the questionnaire is complete, content validation of the questionnaire will be conducted by expert review of the items to verify the specific workplace stressors addressed (L. Hammer). The questionnaire will then be administered to 100 Latino agricultural workers, men and women who have been working in agricultural for the past 3 years. Participants will complete the workplace stress questionnaire along with questionnaires addressing other lifestyle and psychosocial factors of stress. The goal of this aim is to evaluate the workplace questionnaire and to identify and characterize the workplace and lifestyle stressors experienced by agricultural workers. Collecting data at low and high demand times will provide information about changes in workplace stress

across time and job tasks. Participants in the study will be informed of the nature of the study, given a letter of consent in Spanish, and be asked to sign a letter of informed consent that has been approved by the Institutional Review Board at Oregon Health & Science University. The first data collection will occur in the winter during the less demanding work time (pruning). This will allow families to become familiar with the data collection procedures when they have more time available. We anticipate this strategy will improve compliance (based on numerous anecdotal comments) when we approach them during the busy time. Collection will be scheduled at convenient times for farmworkers (evenings and weekends), and every effort will be made to simplify the collection of samples.

Statistical Analysis

Test-Retest reliability involving individual items on the questionnaire will be assessed with Cronbach’s alpha (scale level items) and the Kuder-Richardson 20 for two response items (McCauley et al. 2004). Paired t-tests will be used to examine the relationship between scores (composite total of several related items) at high and low work demand time points. Participants will be grouped by degree of change in workplace stress at the two time points. Participants exhibiting a large change in responses at two time points will indicate greater amounts of workplace stress associated with a specific time point. Other participants may exhibit no variability in workplace stress at the two time points. The correlation between workplace stress and the additional lifestyle and psychosocial factors will be examined to identify potential modifiers and confounders.

Limitations

Although we hypothesize that harvest may be the most demanding work time, workers may experience more stress in lower work demand times because of concerns about unemployment. There may also be no variation in reported stress associated with work demands. It is also important to take into account social support. Social support has long been recognized as serving as a buffer between stressors and strains (e.g., Harvey & Buckley, 1998). As individuals receive more social support, their emotional and psychological resources for dealing with stressors increase, and their appraisals of stressors become less negative (Jex 1998). In particular, support from one’s supervisor has demonstrated a positive effect on a variety of outcomes, including reduced work-family conflict, work distress, absenteeism, intention to quit, and, most recently, blood pressure (Hammer et al. 2007). Varying literacy levels in this population may make it difficult to develop a single form or format that is appropriate for the entire population.

TIMELINE

Activities	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Aim 1: Review Data from current project											
Aim 1: Review other questionnaires											
Aim 1: Focus Groups/Interviews											
Aim 1: Pilot/Revise Questionnaire											
Aim 2: Validation Study											

Data Analysis/Manuscript										
Grant Application										

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BUDGET JUSTIFICATION

Personnel

Diane Rohlman, PhD, Principal Investigator (10% - No Salary Requested)

Dr. Rohlman is an experimental psychologist/cognitive specialization. She is Principal Investigator on the current PNASH project, "Neurobehavioral Assessment of Pesticide Exposure in Children" which built a cohort of 300 families living in an agricultural community, including both agricultural families and non-agricultural families. The research tracked these families for one year. Dr. Rohlman's team interviewed the parents and children, collected home dust samples and administered a neurobehavioral battery to the children two times, one year apart. This project also had her conduct a community-based survey evaluating perceptions and concern about pesticide exposure and she developed a community-based training program on pesticide safety at work and at home. Dr. Rohlman is also PI of a project assessing the adverse effects of organophosphorus pesticides (specifically chlorpyrifos, to which the cohorts have a relatively exclusive exposure history) in adolescent Egyptian pesticide applicators and an investigator on a study of traditional and novel biomarkers in adult pesticide application team workers in Egypt.

Responsibilities. Dr. Rohlman will be responsible for the overall leadership of this project. She will be responsible for the coordination of all study aspects, human subjects materials, coordination of all field activities, data analysis and preparing all scientific and technical reports.

TBN, BS, Research Coordinator (20%)

This position requires a degree in psychology, public health or social science and fluency in Spanish. Research and outreach experience are required.

Responsibilities. The TBN Research Assistant will work under Dr. Rohlman's supervision during the project. The Research Assistant will be responsible for coordinating the questionnaire development, pilot testing, and assembling the project database containing data from all the study components for statistical analysis.

Silvia Huszar Research Assistant (10%)

Ms. Huszar is a Research Assistant at the Center for Research on Occupational and Environmental Toxicology (CROET) at Oregon Health & Science University. She is a native Spanish speaker and has worked with the current PNASH project since 2008. As a member of the community where the research takes place, Ms. Huszar's main role on the current project with PNASH has been to present the project at various community events and to recruit families for the study. She has also been responsible for scheduling interviews and test sessions and assisting with data entry and study coordination.

Responsibilities. Ms. Huszar will work with Dr. Rohlman and the Research Assistant in all aspects of the study. Her primary role will be recruiting study participants and assisting with the pilot testing of the questionnaire. Ms. Huszar is a native Spanish speaker and lives in the community where the research will take place; she will represent the project at various community events.

Local Travel \$2500

Funds are requested for the PI and research staff to travel to Hood River for recruitment, team meetings, data collection and quality control checks. Travel to Hood River costs approximately \$166 per trip including mileage (approximately 200 miles round trip @ \$0.55 per mile) and per diem (\$56 per day).

Other Expenses

Cell Phone Charges: \$1,404

Funds are requested each year for cell phones for the 2 Research Assistants (\$117 per month for 2 phones). The cell phones are for work purposes only and will be used for recruitment, scheduling, logistics of moving equipment and personnel to multiple testing sites as family availability shifts, and study related conference calls.

Participant Reimbursement: \$9,450

Funds are requested to reimburse participants (315 participants at \$30 = \$9,450) for pilot testing and evaluating the questionnaires.