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Work and Health among Latina Mothers in Farmworker Families

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Abstract

Background—Work organization is important for the health of vulnerable workers, particularly women. This analysis describes work organization for Latinas in farmworker families and delineates the associations of work organization with health indicators.

Methods—220 Latino women in farmworker families completed interviews from October 2012 - July 2013. Interviews addressed job structure, job demand, job control, and job support. Health measures included stress, depressive symptoms, physical activity, family conflict, and family economic security.

Results—Three-fifths of the women were employed. Several work organization dimensions, including shift, psychological demand, work safety climate, and benefits, were associated with participant health as expected, based on the work organization and job demands-control-support models.

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Conclusions—Research should address women's health and specific work responsibilities. Occupational safety policy must consider the importance of work organization in the health of vulnerable workers.

Introduction

The organization of work has important implications for worker health.¹⁻² These implications are especially important for immigrant and minority workers, who have few work options,³⁻⁴ and who are over-represented in hazardous manual labor jobs.⁵⁻⁷ Farmworkers are a particularly vulnerable immigrant and minority population who may be affected by work organization.⁸⁻¹¹

The influence of work organization on the health of workers who are members of vulnerable populations is being increasingly recognized. Work organization refers to “the work processes (the way jobs are designed and performed) and to the organizational practices (management and production methods and accompanying human resource policies) that influence job design.”^{1,2} Landsbergis and colleagues³ report that current evidence shows that low income and minority workers are exposed to high levels of job insecurity and work organization hazards with the result of maintaining occupational health disparities. Primary studies document aspects of work organization specifically associated with immigrant worker health outcomes. Immigrant manufacturing workers, with high job demand (e.g., psychological demand, excessive workload, awkward posture, repetitive movement) and little support (e.g., poor safety commitment, abusive supervision) experience greater musculoskeletal and respiratory health problems.¹²⁻¹³ Grzywacz and colleagues¹⁴ document that high job demand (e.g., psychological demand) and low job control are associated with specific clinically diagnosed musculoskeletal injuries (epicondylitis, rotator cuff syndrome) among immigrant manual workers largely employed in manufacturing. Increased use of personal protective equipment, a key factor in protecting worker health, among immigrant manufacturing workers is associated with better work safety climate.¹⁵⁻¹⁸ Work safety climate is related to safety behaviors among immigrant construction workers.¹⁹⁻²¹ Grzywacz and colleagues²² report that such work organization characteristics as long work hours and psychological demand appear to be related to the occurrence of injuries among immigrant construction workers.

Research with agricultural workers provides contradictory support for the influence of work organization on worker health. Grzywacz and colleagues⁹ show evidence that farm work is a “passive job” with low control and low psychological demand, but high physical demand. However, none of these attributes are associated with health outcomes. Arcury and colleagues⁸ report poor work safety climate to be associated with health outcomes among immigrant farmworkers, including greater musculoskeletal discomfort and working while injured. Swanberg and colleagues¹¹ report that abusive supervision and awkward postures are associated with occupational illness among immigrant farmworkers. Using data from the National Agricultural Workers Survey (NAWS), Grzywacz and colleagues¹⁰ find that psychological demand is associated with self-reported fair/poor health and elevated depressive symptoms.

Work organization may be particularly important to the health of immigrant women workers. In addition to paid employment, these immigrant women generally have traditional gender role responsibilities for children, family and domestic tasks.²³⁻²⁴ Immigrant women in farmworker families are especially vulnerable due to isolation in rural areas, lack of services available to them, and limited employment options.²⁵ Yet little research has focused on the impact of work organization on the health of vulnerable immigrant women workers. Associations of abusive supervision with health indicators among manufacturing workers are stronger for women than for men.¹³ Among full-time employed Latina women in manual occupations (e.g., manufacturing, services), Arcury and colleagues²⁶ report that greater job demands, such as awkward posture and psychological demand, are associated with more musculoskeletal and depressive symptoms, and worse mental health related quality-of-life; that limited decision job control is associated with more musculoskeletal and depressive symptoms; and that greater perceived supervisor support and job safety climate are associated with fewer depressive symptoms and better mental health related quality-of-life. In an analysis of clinical musculoskeletal and neurological health among immigrant women employed full-time in manual occupations, Arcury and colleagues²⁷ report that awkward posture and decision latitude are associated with a diagnosis of epicondylitis; that awkward posture and psychological demand are associated with a diagnosis of rotator cuff syndrome; and that awkward posture, psychological demand, decreased skill variety and job control are associated with a diagnosis of carpal tunnel syndrome.

Research considering the association of work organization and health among immigrant women workers is needed. This analysis examines associations of work organization with health characteristics of immigrant women in farmworker families. The job demand-control-support model^{2,28-30} provides a framework for organizing this analysis. This analysis has two aims. First, it describes the work organization for Latinas in farmworker families. Measures of job demand, control, and support, as well as job structure (occupation, number of hours worked, shift) are considered. Second, it delineates the associations of work organization with indicators of health for Latinas in farmworker families.

Methods and Materials

Data for this analysis are from a larger study of health and development of children in farmworker families. “Niños Sanos” is designed to describe the dietary and physical activity patterns of farmworkers' children, identify the individual, familial and community factors associated with overweight and obesity, and delineate variation in children's dietary and physical activity patterns over a two year time. The study protocol was approved by the Wake Forest School of Medicine Institutional Review Board. The study obtained a Certificate of Confidentiality from the National Institutes of Health.

Sample Recruitment and Data Collection

Participants in Niños Sanos were women in farmworker families with a child between 2.0 and 4.0 years of age at recruitment. A farmworker family was defined as having at least one adult member who was employed as a migrant or seasonal farmworker during the previous 12 months. A multi-pronged, site-based sample design³¹⁻³³ was used to identify and recruit

farmworker families to the study because no sampling frame of Latino farmworker families exists and because the narrow child-age range would require contacting a substantial fraction of the eligible population. This sample design is appropriate for hard-to-reach populations³⁴ and has been used in the investigators' research based on well-developed relationships with farmworker-serving institutions.^{19,34-35} "Sites" are organizations or locations with which members of the target community are associated. Some families were associated with multiple sites. Site categories (and number of sites targeted within categories) in this study were: Head Start and Migrant Head Start Programs (7); migrant education programs (15); community health centers (4); WIC (1); community partner non-profit organizations serving Latino immigrants (2); and stores, churches, and events serving predominantly farmworkers (7). In addition, door-to-door recruiting was undertaken in Latino neighborhoods and farmworker camps. Community interviewers contacted families from previous Latino health studies and from personal networks.

Native Spanish-speaking community interviewers contacted participants. The trained interviewers introduced and explained the study, including its requirements and incentives, screened for inclusion/exclusion criterion, and asked the family to participate. Those who agreed to participate completed enrollment and initiated the baseline data collection; in most cases, initiation of baseline data collection was completed at the time of recruitment. All participants provided signed informed consent.

A total of 248 participants (mother-child dyads) were recruited to the study over the period April 2011 through April 2012. Of these, 220 women completed the work organization questionnaire module over the period October 2012 through July 2013 and are included in this analysis. Four additional participants completed the work organization questionnaire while residing in Mexico and were excluded from this analysis due to differences in external context.¹ The remaining 24 participants had either stopped participating in the study or could not be located for the period when the work organization questionnaire was completed. It was not possible to obtain precise figures to calculate refusal or participation rates due to the multi-pronged nature of the site-based sampling, organizations compiling lists of potential participants, as well as study staff conducting direct recruiting at sites. It was not possible to know if those refusing to release information were eligible. Organizations may have compiled incomplete lists from their participants and potential participants could easily have avoided contact at events.

Data collection included a baseline interviewer-administered questionnaire. These interviews were completed in the participants' homes or another location determined by the participant. All interviews were completed in Spanish. Participants completed up to 9 interviews over a two year period. Participants received \$10 for completing each interview and were not given an additional incentive for completing the work organization questionnaire.

Measures

Measures of work organization included indicators of job structure, job demand, job control, and job support. Labor force participation (currently holding a formal part-time or full-time job) was the first job structure measure. Occupation was classified as not employed,

informal work, manufacturing operative, agricultural worker, domestic worker, or other. Informal work was based on a set of questions that first asked if the participant was involved in any “money-making” activities that were not part of a regular job. Informal work included making and selling cakes, catalogue sales (e.g., Avon®), and selling soft drinks from the home. Those giving an affirmative response were asked to describe their “money-making” activities. Based on the review of these “money-making” activities, individuals were coded as to whether they earned money from informal work. Farmworker family had the values of migrant (changed residence over a distance of 75 miles for a family member to be employed in farm work) or seasonal. Hours worked was measured only for those in the labor force and had the values less than 32 hours per week, 32 to 48 hours per week, and more than 48 hours per week. Shift was also measured only for those in the labor force and had the values day shift and non-standard shift (evening, night, or changing shifts). Finally, spouse's occupation had the values of farm work, non-farm work, not working, and no spouse or partner.

Psychological demand (job demand) and the two job control measures, skill variety and job control, were assessed using items modified from the Job Content Questionnaire²⁹ with response options ranging from “seldom/never” (1) through “almost always” (4). Psychological demand is the sum of three items ($\alpha = 0.79$). Skill variety is the sum of four items ($\alpha = 0.70$), and job control is the sum of three items ($\alpha = 0.71$). Higher values indicate greater levels for each concept. Each of these measures has been used previously with immigrant Latino worker populations.^{20,26}

The job support measure, vulnerability, is the sum of 5 items taken from a scale developed by Vives and colleagues,³⁶ with response options being “no” (0) or “yes” (1). These items asked if during the past 12 months on her main job the participant felt that she was afraid to voice a safety concern, was made to feel she could be easily replaced, feared being fired even though she had done nothing wrong, felt treated in a discriminatory or unjust way, and felt defenseless against unfair treatment. Values for the summary score ranged from 0 to 5, with higher scores indicating greater vulnerability ($\alpha = 0.71$). Benefits is the sum of five items asking the participant if her job provides her with paid vacation, paid holidays, health insurance, paid sick leave, and a retirement plan. Values for the summary score ranged from 0 to 5, with greater scores indicating more benefits ($\alpha = 0.91$). Work safety climate was assessed with the Perceived Safety Climate Scale.³⁷ This measure has been used in several studies of immigrant Latino workers.^{8,11,18} Nine of the items in the scale used a four-point Likert format (strongly agree to strongly disagree). The tenth item included three response categories. Two items were not included in the summary score; one was negatively correlated with the total (“workers have almost total control over personal safety”), and the correlation for the other was near zero (“the possibility of being injured at work in the next 12 months is very likely”). Values for the scale ranged from 8 to 31, with higher values indicating better work safety climate ($\alpha = 0.89$).

Five outcome variables are considered: individual stress, depressive symptoms, physical activity, family conflict, and family economic insecurity. Individual stress was assessed with 25 items taken from the Farmworker Stress Inventory.³⁸⁻³⁹ Items asked participants to gauge how stressful each item made them feel (e.g., “not being able to buy things that I want because I make little money;” “I do not have anyone to care for my children while I am

working”) with response options being “have not experienced” (0) to “extremely stressful” (4). Possible scores range from 0 to 100 ($\alpha = 0.87$); greater scores reflect more stress. Depressive symptoms were assessed with the Spanish validated short version of the Center for Epidemiological Studies Depression scale (CES-D).⁴⁰ This 10-item version of the scale delineates the frequency and severity of current depressive symptoms.⁴¹ Items were scored in a 4-point scale and summed. Possible scores range from 0 to 30 ($\alpha=0.84$); greater scores reflect higher levels of depressive symptoms. Occupational and leisure-time physical activity is based on items from the International Physical Activity Questionnaire⁴² (“Think about activities you do at work, as part of your house and yard work, to get from place to place, and in your spare time for recreation, exercise, or sport”). Physical activity is the average minutes per day in the past 7 days in which the participant reported engaging in vigorous physical activity (“activities which take hard physical effort ... make you breathe harder than normal and may include heavy lifting, digging, aerobics, or fast bicycling”) or moderate physical activity (“activities which take moderate physical effort ... make you breathe harder than normal and may include carrying light, bicycling at a regular pace, or volleyball”).

Family conflict was measured with a 9-item subscale of the Family Environment Scale.⁴³ Response options were “true” (1) and “false” (2). Items were recoded as 0 or 1, with 1 being the response that indicates family conflict. These items were then summed (range: 0 to 9). The sum was then dichotomized (0 vs. sum greater than 0) due to a skewed distribution ($\alpha=0.64$). Economic security was measured using four items adapted from Conger and colleagues⁴⁴ (e.g., “During the past year, how much difficulty have you had paying your bills?”), with the items coded so a higher score reflected higher economic security ($\alpha = 0.67$).

Personal characteristics include the participant's age (18 to 25 years, 26 to 35 years, 36 to 45 years), education (0 to 6 years, 7 to 9 years, 10 or more years), whether married or living as married, years in the US (less than 5, 5 to 9, 10 or more), whether any adult family member had documents to be in the US, and number of residential moves in the past 12 months (none versus one or more). American acculturation is based on the mean of 6 items from the scale developed by Cuellar and colleagues;⁴⁵ values could range from 1 to 5 ($\alpha = 0.93$). Ethnic discrimination was measured with 6 items adapted from the Day-to-Day Unfair Treatment subscale of the Experiences of Discrimination scale⁴⁶ (e.g., “On your day-to-day life over the past year, how often have you been treated with less respect, because you are Latino?”). Responses ranged from “4 or more times” (1) to “never” (4)). Responses were reverse coded, so that higher scores indicated higher perceived discrimination ($\alpha=0.80$).

Analysis

Counts and percentages are presented for all personal characteristics, and work organization characteristics. Means, standard deviations, and ranges are presented for all health indicators and work organization scales. Bivariate analyses were conducted using Chi-square tests, linear regression, and analysis of variance in order to assess the relationships of individual and family health outcomes with work organization characteristics. Multivariate models were then developed using multivariate linear and logistic regression. Independent measures

included in the multivariate analyses were limited to predictors that had at least one association with an outcome in the bivariate analyses that had a p-value of <0.10 . All multivariate analyses were adjusted for education, American acculturation, documentation status, and number of moves.

Results

Participant Personal and Health Characteristics

Participants ranged in age from 18 to 45 years, with 55.9% being aged 26 to 35 years (Table 1). Most of the women had less than 10 years of education, with 42.3% having 0 to 6 years, and 31.4% having 7 to 9 years. Most (90.5%) were married or living as married. Almost half (48.4%) had been living in the United States for 10 or more years, with few (8.7%) living in the United States for fewer than 5 years. Few of these women (14.7%) lived in families in which any adult had proper immigration documents. Few (7.3%) had changed residence in the previous 3 months. The mean score for American acculturation was 1.94 (SD = 1.06), and for discrimination was 1.32 (SD = 0.51). The mean for the individual health indicator stress was 25.81 (SD = 15.96), with the mean for depressive symptoms being 5.95 (SD = 4.53), and physical activity being 33.90 (SD = 82.87) (Table 2). The mean for the family health indicator conflict was 1.39 (SD = 1.60), and for economic security was 2.27 (SD = 1.05).

Work Attributes of Latina Women in Farmworker Families

Most (60.9%) of the participants were in the labor force (Table 3). Almost one-third were not employed, and 9.5% had informal work. Agricultural worker was the most common formal occupation (30.5%), followed by domestic worker (13.2%) and operative (9.1%). Most (55.6%) participants worked 32 to 48 hours per week, with 24.1% working less than 32 hours per week, and 20.3% working more than 48 hours per week. Most (72.9%) worked first or day shift. Almost one-quarter (23.6%) of the families had a member who was a migrant farmworker, and three-quarters (76.4%) of the families had a member who was a seasonal farmworker. A plurality (41.4%) of participants had spouses employed in farm work at the time of the work organization interview; 37.7% had spouses employed in non-agricultural jobs, 11.8% had spouses without jobs, and 9.1% did not have a spouse or partner.

Participants' jobs were psychological demanding, had limited skill variety, and allowed for little control (Table 4). The mean score for Psychological Demand was 6.80 (SD = 2.48; range 3.0 to 12.0). Less than three-fifths (56.4%) felt they were given enough time to complete their job. About 45% stated that their jobs required working very fast and that their jobs were hectic. Over one-quarter (27.1%) indicated they were asked to do an excessive amount of work. The mean score for Skill Variety was 6.57 (SD = 2.40; range 4.0 to 16.0), indicating that this attribute was limited in the work of these immigrant women. Most (72.9%) reported that their job involved repetitive work. About 12% stated that their job required creativity and allowed for a variety of activities. Only 5.3% reported that their job required that they learn new things. The mean score for Job Control was 3.96 (SD = 1.45;

range of 3.0 to 12.0); for each item, no more than 6 (4.5%) participants indicated that they had any control.

Few of the women felt vulnerable; the mean vulnerability score was 0.30 (SD = 0.81; range 0.0 to 5.0). No more than 11 (8.3%) participants answered any item in a manner to indicate that they felt they could not voice a concern, felt defenseless, were afraid of being fired, were treated in a discriminatory or just way, or felt they could be easily replaced. Almost none of the women reported having any benefits; the mean benefits score was 0.39 (SD = 1.13; range 0.0 to 5.0). Only 14 participants (10.6%) reported having any benefit.

The majority of the participants did not endorse any item indicating that they perceived work safety to be more valued than production. The mean work safety climate score was 16.77 (SD = 5.04; range 8.0 to 27.0). Only 65 (49.2%) reported that they were regularly made aware of dangerous work practices or conditions, and only 56 (42.4%) perceived that worker safety practices were important to management. Fifty (38.2%) participants reported always having proper safety equipment available. Twenty-eight (21.2%) felt that their supervisors did as much as possible to make their work safe. Three-quarters stated that it was likely they would be injured at work in the next 12 months.

Associations of Work Organization Attributes with Health Characteristics

Several of the work characteristics were associated with the level of stress reported by the participants (Table 5). Stress was less among those employed as operatives compared to those employed as agricultural workers ($\beta = -14.17$; $p < 0.001$). Stress was greater among those with a spouse employed in farm work ($\beta = 13.22$; $p < 0.001$), or who had no spouse or partner ($\beta = 8.78$; $p = 0.04$). Those with greater psychological demand had greater stress ($\beta = 2.13$; $p < 0.001$). Those with greater perceived work safety climate also had greater stress ($\beta = 0.73$; $p < 0.01$). Finally, those working a shift other than day shift trended to experience lower stress ($\beta = -4.64$; $p = 0.080$).

Depressive symptoms were greater among those who were members of migrant compared to seasonal farmworker families ($\beta = 2.88$; $p < 0.001$), and among those with greater skill variety ($\beta = 0.33$; $p = 0.03$). There was a trend for more depressive symptoms among those working a shift other than day shift ($\beta = 1.32$; $p = 0.08$), and among those experiencing greater psychological demands ($\beta = 0.26$; $p = 0.06$).

Physical activity was greater among those with a spouse or partner who did farm work ($\beta = 73.21$; $p < 0.01$), and among those with greater psychological demand ($\beta = 9.20$; $p < 0.01$). It trended to being greater among those employed as operatives ($\beta = 50.32$; $p = 0.06$) and less among those employed in an Other job ($\beta = -47.46$; $p = 0.08$), compared to those employed as agricultural workers. It also trended to being greater among those who were from migrant versus seasonal farmworker families ($\beta = 38.92$; $p = 0.07$).

Participants with greater skill variety had a greater odds of family conflict (Odds ratio = 1.4; 95% confidence interval 1.1, 1.7). Being in a migrant farmworker family was related to less economic security than being in a seasonal farmworker family ($\beta = -0.69$; $p < 0.01$), and to having no spouse or partner ($\beta = -0.85$; $p = 0.01$). Psychological demand was also associated

with less economic security ($\beta = -0.11$; $p < 0.01$). Work safety climate ($\beta = 0.05$; $p = 0.01$) and having more benefits ($\beta = 0.21$; $p = 0.02$) were associated with greater economic security.

Discussion

Many of the women in farmworker families are employed, whether their families are seasonal or migrant farmworkers. Most of those who are employed do farm work or provide the domestic work of cooking and cleaning on farms. A small but substantial number work as operatives in manufacturing or do informal work. Many work long hours and over one-quarter work non-standard shifts. The work that these women perform is demanding, lacks variety, provides them with little control, provides few benefits, and does not engender a sense of safety. Surprisingly, few women in farmworker families feel they were vulnerable; they are not afraid to voice concerns, and they do not feel defenseless.

The results provide some evidence to support the importance of work organization for understanding the health of immigrant women workers and other vulnerable work populations.^{1,3,28,30} Similar to other research, work organization characteristics have some associations with health for the employed participants.^{26,27} How the participant and her spouse are employed in agriculture results in health consequences. Participants employed as agriculture workers, compared to those employed as operatives, have greater stress and less physical activity. Those with a spouse employed in farm work, compared to those whose spouse is not working, have greater stress and greater physical activity. Those who are in migrant versus seasonal farmworker families had more depressive symptoms, more physical activity, and less economic security. Summarizing across these measures, working in agriculture or having a spouse working in agriculture, or being a migrant is detrimental to the health of these women, except in the domain of physical activity. However, it appears that the physical activity for these women is based on the demands of work rather than a desire to maintain fitness. Future research with immigrant women in vulnerable worker populations needs to focus on the differences of work related physical activity and leisure physical activity.⁴⁷⁻⁴⁸

Several of the standard work organization dimensions, including shift, psychological demand, work safety climate, and benefits, were associated with the health of the participants as expected, based on the work organization and job demands-control-support models.¹⁻² Women who worked a non-standard shift had greater stress and depressive symptoms. Those with greater psychological demand had lower stress, greater depressive symptoms, and less economic security. Other research with immigrant women workers and general samples of immigrant farmworkers also reports that psychological demand is associated with greater depressive symptoms.^{10,26,49} Greater psychological demand was also related to greater physical activity, raising the question of measures of work versus leisure physical activity. Greater benefits were associated with greater economic security.

Greater work safety climate was associated with greater economic security, but also with greater stress. Work safety climate being associated with greater economic security reflects expectations of the work organization and job demands-control-support models, as well as

other research with Latino immigrant workers indicating the importance of work safety climate for greater occupational health and safety. For example, poor work safety climate was associated with greater reported musculoskeletal injury and working while injured among farmworkers,^{8,50} while greater work safety climate was associated with greater safety behaviors among construction workers,⁵¹ and with greater availability and use of PPE among poultry processing workers.¹⁷ In this context, the association of greater work safety climate with greater stress is counter-intuitive and has no known precedent in the literature. Existing research indicates an association of work safety climate with fewer depressive symptoms among immigrant Latina workers,²⁶ as well as among other workers.⁵²

The job demand-control-support model^{2,30} predicts a positive association of health with job control and job support factors, such as skill variety. However, current results indicate that skill variety is associated with greater depressive symptoms and greater family conflict among employed women in immigrant farmworker families, and that work safety climate is associated with greater stress. These results are similar to findings of previous research. For example, in a longitudinal study of immigrant female and male manual workers (none engaged in farm work), Arcury and colleagues⁴⁹ report that skill variety results in greater depressive symptoms. In cross-sectional analyses of immigrant women manual workers, Arcury and colleagues²⁶ find that skill variety is positively associated with greater depressive symptoms. Based on these results, Arcury and colleagues argue⁴⁹ that the “control” provided to these workers, largely with limited formal education, working in jobs that are not familiar to them, but which they fear losing, is perceived as a risk that could cause failure and economic jeopardy. These workers may perceive that the more choices they have, the more errors they can make. This interpretation is consistent with analyses indicating that the well-being of Latino immigrant workers is associated with perceived supervisor control.

Arcury and colleagues²⁶ report a positive association of perceived supervisor control on mental health related quality-of-life, a finding which reflects other research. Swanberg and colleagues¹¹ argue that supervisor attitudes toward safety increases safety among immigrant farmworkers. Similarly, Hoppe and colleagues⁵³ report that supervisor support increases well-being among Latino warehouse workers. This interpretation indicates the importance of culture in applying the job demand-control-support model to understanding the effects of work organization on worker health. The participants in this analysis are Latino and largely of rural, peasant backgrounds,⁵⁴ and this cultural background can affect how they view decision making and their relationship to supervisors. Future work organization research should focus on how Latino manual workers' perceptions of decision latitude and supervisor power affect worker health and well-being.

The results of this research should be interpreted in light of its limitations. The study sample, although representative of farmworker families, was not selected randomly; this may result in some biases. The sample was recruited from a single state; generalizations to farmworker communities in other states should be made with caution. Data measuring all work organization characteristics could not be collected; other dimensions of work organization need to be considered for a complete analysis of the ways work is associated with the health of women in farmworker families. Finally, these data are cross-sectional; causality must be

inferred with caution. These limitations are balanced by the strengths of this research, which include a large number of participants recruited with the help of local organizations and who remained engaged in the research for two years.

This research suggests several directions for future research on work organization and health for vulnerable workers. Research is needed that addresses specific health outcomes, such as leisure versus non-leisure based physical activities, and considers cultural differences in the interpretation of work characteristics. Research with women workers from vulnerable populations, such as immigrants, needs to consider the domestic responsibilities of these women and the effects of the work of their spouses or partners on their health. Occupational safety policy must consider the importance of work organization in the health of vulnerable workers. The psychological demands of the work in which these workers are engaged, the lack of benefits that they receive, and the limited perceived safety of their workplaces all are associated with key markers of health status.

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References

1. Sauter, SL.; Brightwell, WS.; Colligan, MJ., et al. The changing organization of work and the safety and health of working people. Cincinnati, OH: Department of Health and Human Services; 2002. Report No. DHHS (NIOSH) No. 2002-116
2. Snyder LA, Krauss AD, Chen PY, Finlinson S, Huang YH. Occupational safety: application of the job demand-control-support model. *Accid Anal Prev*. 2008; 40:1713–1723. [PubMed: 18760100]
3. Landsbergis PA, Grzywacz JG, LaMontagne AD. Work organization, job insecurity, and occupational health disparities. *Am J Ind Med*. 2014; 57:495–515. [PubMed: 23074099]
4. Grzywacz JG, Lipscomb HJ, Casanova V, et al. Organization of work in Agricultural, Forestry and Fishing Sector in the US Southeast: implications for immigrant workers' occupational safety and health. *Am J Ind Med*. 2013; 56:925–939. [PubMed: 23532742]
5. Chung-Bridges K, Muntaner C, Fleming LE, et al. Occupational segregation as a determinant of US worker health. *Am J Ind Med*. 2008; 51:555–567. [PubMed: 18553362]
6. Forst L, Avila S, Anozie S, Rubin R. Traumatic occupational injuries in Hispanic and foreign born workers. *Am J Ind Med*. 2010; 53:344–351. [PubMed: 19753594]
7. Pransky G, Moshenberg D, Benjamin K, Portillo S, Thackrey JL, Hill-Fotouhi C. Occupational risks and injuries in non-agricultural immigrant Latino workers. *Am J Ind Med*. 2002; 42:117–123. [PubMed: 12125087]
8. Arcury TA, O'Hara H, Grzywacz JG, Isom S, Chen H, Quandt SA. Work safety climate, musculoskeletal discomfort, working while injured, and depression among migrant farmworkers in North Carolina. *Am J Public Health*. 2012; 102(suppl 2):S272–S278. [PubMed: 22401520]
9. Grzywacz JG, Quandt SA, Arcury TA. Immigrant farmworkers' health-related quality of life: an application of the job demands-control model. *J Agric Saf Health*. 2008; 14:79–92. [PubMed: 18376537]
10. Grzywacz JG, Alterman T, Gabbard S, et al. Job control, psychological demand, and farmworker health: evidence from the National Agricultural Workers Survey. *J Occup Environ Med*. 2014; 56:66–71. [PubMed: 24351891]
11. Swanberg JE, Clouser JM, Westneat S. Work organization and occupational health: perspectives from Latinos employed on crop and horse breeding farms. *Am J Ind Med*. 2012; 55:714–728. [PubMed: 22431196]

12. Grzywacz JG, Arcury TA, Marín A, et al. The organization of work: implications for injury and illness among immigrant Latinos in poultry processing. *Arch Environ Occup Health*. 2007; 62:19–26. [PubMed: 18171643]
13. Marín AJ, Grzywacz JG, Arcury TA, Carrillo L, Coates ML, Quandt SA. Evidence of organizational injustice in poultry processing plants: possible effects on occupational health and safety among Latino workers in North Carolina. *Am J Ind Med*. 2009; 52:37–48. [PubMed: 18942666]
14. Grzywacz JG, Arcury TA, Mora D, et al. Work organization and musculoskeletal health: clinical findings among immigrant Latino workers. *J Occup Environ Med*. 2012; 54:995–1001. [PubMed: 22821071]
15. Zohar D. Safety climate in industrial organizations: theoretical and applied implications. *J Appl Psychol*. 1980; 65:96–102. [PubMed: 7364709]
16. Zohar D. Thirty years of safety climate research: reflections and future directions. *Accid Anal Prev*. 2010; 2:1517–1522. [PubMed: 20538108]
17. Arcury TA, Grzywacz JG, et al. Personal protective equipment and work safety climate among Latino poultry processing workers in western North Carolina, USA. *Int J Occup Environ Health*. 2012; 18:320–328. [PubMed: 23433293]
18. Arcury TA, Grzywacz JG, Anderson AM, et al. Employer, use of personal protective equipment, and work safety climate: Latino poultry processing workers. *Am J Ind Med*. 2013; 56:180–188. [PubMed: 22847579]
19. Arcury TA, Weir M, Chen H, et al. Migrant farmworker housing regulation violations in North Carolina. *Am J Ind Med*. 2012; 55:191–204. [PubMed: 22237961]
20. Arcury TA, Summers P, Carrillo L, Grzywacz JG, Quandt SA, Mills TH. Occupational safety beliefs among Latino residential roofing workers. *Am J Ind Med*. 2014; (57):718–725. [PubMed: 24006046]
21. Roelofs C, Sprague-Martinez L, Brunette M, Azaroff L. A qualitative investigation of Hispanic construction worker perspectives on factors impacting worksite safety and risk. *Environ Health*. 2011; 10:84. [PubMed: 21962128]
22. Grzywacz JG, Quandt SA, Marín A, et al. Occupational injury and work organization among immigrant Latino residential construction workers. *Am J Ind Med*. 2012; 55:698–706. [PubMed: 22266800]
23. Borrell C, Muntaner C, Benach J, Artazcoz L. Social class and self-reported health status among men and women: what is the role of work organisation, household material standards and household labour? *Soc Sci Med*. 2004; 58:1869–1887. [PubMed: 15020005]
24. Guendelman S, Malin C, Herr-Harthorn B, Vargas PN. Orientations to motherhood and male partner support among women in Mexico and Mexican-origin women in the United States. *Soc Sci Med*. 2001; 52:1805–1813. [PubMed: 11352407]
25. Quandt, SA. Health of children and women in the farmworker community in the eastern United States. In: Arcury, TA.; Quandt, SA., editors. *Latino farmworkers in the eastern United States: health, safety, and justice*. New York: Springer; 2009. p. 173–200.
26. Arcury TA, Grzywacz JG, Chen H, Mora DC, Quandt SA. Work organization and health among immigrant women: Latina manual workers in North Carolina. *Am J Public Health*. 2014 Jan 16. Epub ahead of print.
27. Arcury TA, Cartwright MS, Chen H, et al. Musculoskeletal and neurological injuries associated with work organization among immigrant Latino women manual workers in North Carolina. *Am J Ind Med*. 2014; 57:468–475. [PubMed: 24436169]
28. Karasek RA Jr. Job demands, job decision latitude, and mental strain: implications for job. *Adm Sci Q*. 1979; 24:285–308.
29. Karasek R, Brisson C, Kawakami N, Houtman I, Bongers P, Amick B. The job content questionnaire (JCQ): an instrument for internationally comparative assessments of psychosocial job characteristics. *J Occup Health Psychol*. 1998; 3:322–355. [PubMed: 9805280]
30. Johnson JV, Hall EM. Job strain, work place social support, and cardiovascular disease: a cross-sectional study of a random sample of the Swedish working population. *Am J Public Health*. 1988; 78:1336–1342. [PubMed: 3421392]

31. Arcury TA, Quandt SA. Participant recruitment for qualitative research: a site-based approach to community research in complex societies. *Hum Organ*. 1999; 58:128–133.
32. Faugier J, Sargeant M. Sampling hard to reach populations. *J Adv Nurs*. 1997; 26:790–797. [PubMed: 9354993]
33. Muhib FB, Lin LS, Stueve A, et al. Community intervention trial for youth study team. A venue-based method for sampling hard-to-reach populations. *Public Health Rep*. 2001; 116(Suppl 1): 216–222. [PubMed: 11889287]
34. Parrado EA, McQuiston C, Flippen CA. Participatory survey research integrating community collaboration and quantitative methods for the study of gender and HIV risks among Hispanic migrants. *Sociol Methods Res*. 2005; 34:204–239.
35. Quandt SA, Grzywacz JG, Talton JW, et al. 2013. Evaluating the effectiveness of a lay health promoter-led community-based participatory pesticide safety intervention with farmworker families. *Health Promot Pract*. 2013; 14:425–432. [PubMed: 23075501]
36. Vives A, Amable M, Ferrer M, et al. The Employment Precariousness Scale (EPRES): psychometric properties of a new tool for epidemiological studies among waged and salaried workers. *Occup Environ Med*. 2010; 67:548–555. [PubMed: 20576923]
37. Gillen M, Baltz D, Gassel M, Kirsch L, Vaccaro D. Perceived safety climate, job demands, and coworker support among union and nonunion injured construction workers. *J Safety Res*. 2002; 33:33–51. [PubMed: 11979636]
38. Magaña CG, Hovey JD. Psychosocial stressors associated with Mexican migrant farmworkers in the Midwest United States. *J Immigr Health*. 2003; 5:75–86. [PubMed: 14512761]
39. Hiott A, Grzywacz JG, Davis SW, Quandt SA, Arcury TA. Migrant farmworker stress: mental health implications. *J Rural Health*. 2008; 24:32–39. [PubMed: 18257868]
40. Gzywacz JG, Quandt SA, Chen H, et al. Depressive symptoms among Latino farmworkers across the agricultural season: structural and situational influences. *Cultur Divers Ethnic Minor Psychol*. 2010; 16:335–343. [PubMed: 20658876]
41. Kim G, DeCoster J, Huang CH, Chiriboga DA. Race/ethnicity and the factor structure of the Center for Epidemiologic Studies Depression Scale: a meta-analysis. *Cultur Divers Ethnic Minor Psychol*. 2011; 17:381–396. [PubMed: 21988578]
42. Craig CL, Marshall AL, Sjöström M, et al. International physical activity questionnaire: 12-country reliability and validity. *Med Sci Sports Exerc*. 2003; 35:1381–95. 2003. [PubMed: 12900694]
43. Moos, RH.; Moos, BS. *Family Environment Scale Manual: Development, Applications, Research*. Palo Alto, CA: Consulting Psychologists Press; 1994.
44. Conger RD, Wallace LE, Sun Y, Simons RL, McLoyd VC, Brody GH. Economic pressure in African American families: a replication and extension of the family stress model. *Dev Psychol*. 2002; 38:179–193. [PubMed: 11881755]
45. Cuéllar I, Arnold B, Maldonado R. Acculturation rating scale for Mexican Americans-II: a revision of the original ARSMA scale. *Hisp J Behav Sci*. 1995; 7:275–304.
46. Krieger N, Smith K, Naishadham D, Hartman C, Barbeau EM. Experiences of discrimination: validity and reliability of a self-report measure for population health research on racism and health. *Soc Sci Med*. 2005; 61:1576–1596. [PubMed: 16005789]
47. Martinez SM, Arredondo EM, Roesch S, Patrick K, Ayala GX, Elder JP. Walking for transportation among Latino adults in San Diego County: who meets physical activity guidelines? *J Phys Act Health*. 2011:898–906. [PubMed: 21885880]
48. Tremblay MS, Bryan SN, Pérez CE, Ardern CI, Katzmarzyk PT. Physical activity and immigrant status: evidence from the Canadian Community Health Survey. *Can J Public Health*. 2006; 97:277–282. [PubMed: 16967745]
49. Arcury TA, Chen H, Walker FO, Cartwright MS, Mora DC, Quandt SA. The effects of work organization on the health of immigrant manual workers: a longitudinal analysis. *Arch Env Occ Health*. 2014 2014. in press.
50. Swanberg JE, Clouser JM, Browning SR, Westneat SC, Marsh MK. Occupational health among Latino horse and crop workers in Kentucky: the role of work organization factors. *J Agromedicine*. 2013; (18):312–325. [PubMed: 24125046]

51. Arcury TA, Mills T, Marín AJ, et al. Work safety climate and safety practices among immigrant Latino residential construction workers. *Am J Ind Med.* 2012; 55:736–745. [PubMed: 22544480]
52. Hall GB, Dollard MF, Winefield AH, Dormann C, Bakker AB. Psychosocial safety climate buffers effects of job demands on depression and positive organizational behaviors. *Anxiety Stress Coping.* 2013; 26:355–377. [PubMed: 22793792]
53. Hoppe A, Heaney CA, Fujishiro K. Stressors, resources, and well-being among Latino and White warehouse workers in the United States. *Am J Ind Med.* 2010; 53:252–263. [PubMed: 19774551]
54. Wolf, ER. *Peasants*. Upper Saddle River, NJ: Prentice-Hall; 1966.

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Table 1

Personal Characteristics, Women in Farmworker Families, North Carolina (n = 220).

Personal Characteristics	n	%
Age in Years		
18 to 25	62	28.2
26 to 35	123	55.9
36 to 45	35	15.9
Education in Years		
0 to 6	93	42.3
7 to 9	69	31.4
10 or more	58	26.4
Married or Living as Married	199	90.5
Years in US		
Less than 5	19	8.7
5 to 9	94	42.9
10 or more	106	48.4
Any Adult in Family with Documents	32	14.7
Number of Residential Moves in Past 12 Months		
None	204	92.7
One or more	16	7.3

Table 2

Health Indicators for Women in Farmworker Families, North Carolina (n = 220).

Health Indicators	Mean	Standard Deviation	Range
Individual Health			
Stress	25.81	15.96	0 – 67.0
Depressive Symptoms	5.95	4.53	0 – 25.0
Physical Activity	33.90	82.87	0 – 514.3
Family Health			
Conflict	1.39	1.60	0 – 8.0
Economic Security	2.27	1.05	0 – 4.0

Table 3

Job Structure Characteristics, Women in Farmworker Families, North Carolina (n = 220).

Work Structure Characteristics	n	%
Labor Force Participation	134	60.9
Occupation		
Not employed	65	29.5
Informal work	21	9.5
Agricultural worker	67	30.5
Domestic worker	29	13.2
Manufacturing operative	20	9.1
Other	18	8.2
Hours Worked (those in labor force)		
Less than 32	32	24.1
32 to 48	74	55.6
More than 48	27	20.3
Shift (those in labor force)		
First or day shift	97	72.9
Non-standard shift	36	27.1
Farmworker Family		
Migrant	52	23.6
Seasonal	168	76.4
Spouse's Current Employment		
Farm work only	91	41.4
Non-farm work	83	37.7
Not working	26	11.8
No spouse or partner	20	9.1

Table 4
Work Organization Characteristics, Women in Farmworker Families, North Carolina (n = 133).

Work Organization Characteristics	Often/Always Yes			Score		
	n	%	Mean	SD	Range	
Psychological Demand			6.80	2.48	3.0-12.0	
Given enough time to complete job*	75	56.4				
Job is very hectic	60	45.1				
Job requires working very fast	58	43.6				
Asked to do excessive amount	36	27.1				
Skill Variety			6.57	2.40	4.0-16.0	
Job involves repetitive work*	97	72.9				
Job allows variety of activities	17	12.8				
Job requires creativity	16	12.0				
Job requires learning new things	7	5.3				
Job Control			3.96	1.45	3.0-12.0	
Job allows say about activities	6	4.5				
Job allows freedom	5	3.8				
Job allows decision making	4	3.0				
Vulnerability			0.30	0.81	0.0-5.0	
Concerned about your safety on your job, but were afraid to voice your concern	11	8.3				
Made to feel that you could be easily replaced by a boss or supervisor	11	8.3				
Afraid of being fired, even though you did nothing wrong	7	5.3				
Treated in a discriminatory or unjust way on your job	6	4.5				
Felt defenseless against unfair treatment directed toward you on your job	5	3.8				
Benefits			0.39	1.13	0.0-5.0	
Paid vacation	14	10.6				
Paid holiday	14	10.6				
Health insurance	10	7.6				
Paid sick leave	9	6.8				
Retirement plan	4	3.0				
Work Safety Climate			16.77	5.04	8.0-27.0	

Work Organization Characteristics	Often/Always Yes		Score	
	n	%	Mean	SD Range
Workers are regularly made aware of dangerous work practices or conditions	65	49.2		
Workers' safety practices are very important to management	56	42.4		
Workers receive instructions on safety when hired	51	38.9		
Proper safety equipment is always available	50	38.2		
Taking risks is not a part of my job	47	35.6		
Workers are regularly praised for safe conduct	37	28.0		
Workers attend regular safety meetings	29	22.0		
Supervisors do as much as possible to make my job safe**	28	21.2		
Workers have almost total control over personal safety***	115	87.1		
The possibility of being injured at work in the next 12 months is very likely***	96	74.4		

* Reverse scored.

** Versus those who responded, "they could do more to make my job safe" or "they are only interested in doing the job fast and cheaply."

*** Not included in summary score because they were not positive associated with the total score.

Table 5

Association of Women's Work Organization Characteristics With Individual and Family Health Women in Farmworker Families with Labor Force Participation, North Carolina (n = 133).

Work Structure and Work Organization Characteristics	Individual Health						Family Health			
	Stress			Depressive Symptoms			Physical Activity		Family Conflict	
	β	SE	p-value	β	SE	p-value	β	SE	Odds Ratio	95% CI
Occupation (Reference group: Agricultural worker)										
Operative	-14.17	3.72	<0.001	-0.49	1.06	0.64	50.32	26.86	0.06	4.2 (0.7, 25.0)
Domestic worker	-4.70	3.15	0.14	0.06	0.94	0.89	-3.45	22.71	0.88	0.9 (0.3, 3.0)
Other	-2.09	3.71	0.57	-1.21	1.05	0.25	-47.46	26.75	0.08	0.8 (0.2, 2.9)
Migrant Farmworker Family (Reference group: Seasonal)	1.42	2.92	0.62	2.88	0.83	<0.001	38.92	21.09	0.07	1.3 (0.5, 3.7)
Non-standard shift (Reference group: Day shift)	-4.64	2.63	0.08	1.32	0.75	0.08	10.04	19.00	0.60	2.0 (0.7, 5.9)
Current Employment Spouse (Reference group: Not working)										
Farm work	13.22	3.36	<0.001	-1.13	0.95	0.24	73.21	24.23	<0.01	1.6 (0.4, 5.5)
Non-farm work	2.67	3.29	0.42	-0.75	0.93	0.42	31.75	23.74	0.18	2.2 (0.6, 7.7)
No spouse or partner	8.78	4.45	0.04	0.60	1.26	0.63	9.18	32.09	0.77	4.9 (0.8, 30.7)
Psychological Demand	2.13	0.49	<0.001	0.26	0.14	0.06	9.20	3.51	<0.01	1.0 (0.8, 1.2)
Skill Variety	-0.24	0.54	0.66	0.33	0.15	0.03	2.91	3.87	0.45	1.4 (1.1, 1.7)
Work Safety Climate	0.73	0.25	<0.01	-0.01	0.07	0.93	-0.90	1.83	0.62	1.0 (0.9, 1.1)
Benefits	-1.15	1.22	0.35	0.06	0.35	0.85	2.33	8.81	0.79	1.2 (0.7, 2.1)

All analyses adjusted for education, American acculturation, documentation, and number of moves.