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The Organization of Work: Implications for Injury and Illness Among Immigrant Latino Poultry-Processing Workers

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ABSTRACT. The US poultry-processing industry employs a large number of immigrants and has among the highest occupational illness rates for manufacturing. Previous research has not studied the potential health effects of psychosocial indicators of how poultry-processing work is organized. The investigators collected survey data from 200 immigrant Latinos working in poultry processing. Management practices (eg, poor commitment to safety, abusive supervision) and indicators of job design (eg, authority, variety, psychological workload, frequent awkward posture, and repetitive movement) were associated with risk of recent musculoskeletal problems, respiratory problems, and self-reported injury/illness. The results provide preliminary evidence suggesting that the organization of work underlies injury and illness among immigrant workers in poultry processing.

KEYWORDS: injury, job design, occupational stress, safety, symptoms, work organization

The risk of occupational injury and illness among workers in the poultry-processing industry is substantial.¹ In 2004, the nonfatal injury rate was 5.5 per 100 full-time workers, and the illness rate was 2.3 per 100 full-time workers.^{2,3} Recognizing that estimates from the Bureau of Labor Statistics Annual Survey of Occupational Illness and Injuries underestimate nonfatal occupational injuries,⁴ a minimum of 7.8% of full-time poultry-processing workers, or nearly 20,000 individuals, reported occupational injuries or illnesses in 2004. Common injuries and illnesses among poultry-processing workers include a host of musculoskeletal disorders, including cumulative trauma disorders, as well as respiratory and dermatologic conditions.¹ In 2004, poultry processing had the sixth highest occupational illness rate of any private industry in the United States.⁵

In 2004, the poultry-processing industry employed an estimated 235,100 workers.² A substantial proportion of these workers are concentrated in southern states, including North Carolina, Georgia, Alabama, Mississippi, and Arkansas.⁶ Greater than 50% of poultry production is controlled by 5 corporations, resulting in a heavily consolidated industry that is intensely competitive. Turnover in poultry processing is known to be high, exceeding 100% in some plants,¹ suggesting that the number of current workers dramatically underestimates the number of individuals exposed to the industry. During the 1980s, the number of poultry-processing workers represented by a union fell from 46% to 21% and remains low.¹ Although the industry has long relied on a predominantly minority workforce, it is increasingly reliant on workers who are foreign born.¹ Fully 42% of

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poultry-processing workers are Hispanic, and 26% are foreign born, representing countries from across Latin America, Southeast Asia, and the Pacific.

The National Occupational Research Agenda contends that worker health is partly a function of the *organization of work*, which refers broadly to organizational practices related to management and production methods as well as the way jobs are designed and performed.⁷ The organization of work shapes virtually every element of workers' lives on the job, including the safety climate, the physical and psychological demands required by the work that is performed, and the amount of control that workers are able to exert over their work. Substantial research indicates that physical and psychological features of the work environment reflecting how work is organized contribute to a variety of worker health outcomes, including onset of musculoskeletal problems, greater risk of compensable spinal injury, experiencing an occupational accident, as well as experiencing coronary heart disease and cardiovascular mortality.⁸⁻¹¹

The organization of poultry processing, which is oriented toward efficiently transforming live animals into consumable food products, creates a variety of factors that undermine worker health.^{1,12} Increased mechanization and assembly-line production requires protracted periods of standing and rapid repetitive motions; both contribute to musculoskeletal injuries, including repetitive trauma disorders and chronic low back pain.^{1,13} Close proximity among workers on the production line coupled with rapid line speeds and heavy reliance on hand tools contributes to unintentional injuries.¹ The relative lack of control over work, particularly the speed of the production line, and restricted range of task variety inherent in assembly line production creates stress and contributes to illness and injury.^{1,13,14} Chronic ambient noise and the continual pace of the production line are psychologically demanding and are believed to undermine worker health through physiological and behavioral stress processes.^{14,15} Intense competition among poultry-processing operations can undermine safety standards within the industry as organizations seek ways to minimize production costs.¹² Finally, an ethnically diverse, foreign-born workforce is at risk for occupational injury and illness because of difficulties in communication, training, and enforcement of safety standards, as well as fears on the part of undocumented workers about raising safety concerns.¹

Little research has examined associations of health with variables reflecting how poultry-processing work is organized. The most recent research indicated that workers who perceived that their managers had little commitment to safety were more likely to report work-related injury or illness.¹⁶ Otherwise, earlier research indicated that full-time and rotating poultry inspectors experienced elevated rates of musculoskeletal, respiratory, and other health complaints.¹⁷ More recent evidence from a single cohort of workers in poultry slaughter and canning in France indicates that several variables reflecting the organization of work were

associated with worker illness and injury. Working in awkward postures, measured in terms of poorly fitted workstations, performing repetitive movements, and arm exertion were associated with greater risk of Raynaud's phenomenon, general sickness absence, and musculoskeletal-related sickness absence.^{18,19} Psychological strain from work requiring focused concentration, irregular working hours, and the quality of supervisor-subordinate and coworker relations were also associated with greater risk of Raynaud's phenomenon, elevated blood pressure, and sickness absence.^{19,20} Although based on a specific cohort, the results of these studies support the argument that the organization of poultry-processing work can contribute to variation in worker illness and injury. Because of communication difficulties and power relations associated with race and ethnicity and fear of deportation due to faulty immigration documents, the experience of work organization is likely to be unique among immigrant poultry workers, even relative to other workers within the same industry. Thus, the examination of work organization presented here is a unique picture of the workplace through the eyes of a large and rarely considered group of manual workers.

Our goal in this study was to determine whether variables reflecting the organization of work are associated with occupational illness and injury among immigrant Latino poultry-processing workers. The organization of work variables on which we focus capture management methods related to safety and supervision, as well as common indicators of how jobs are designed and performed. Given the relative paucity of previous research, particularly in the United States, we begin by describing the organization of work variables measured in this study. We then explore the associations of organization of work variables with workers' reports of occupational illness and injury. Despite the strong conceptual basis for our study, we take an exploratory approach because the broader project from which the data for this study were obtained was not designed to conduct definitive hypothesis testing.

METHODS

Design

The data for this study were collected as part of a larger community-based participatory research project titled *JUSTA: Justice and Health for Poultry Workers*, which created health education materials that empower and enhance the health of poultry workers and the broader poultry-worker community. To identify potential targets and content for health education materials, the research team conducted a cross-sectional survey, designed to explore the potential health-related implications of the organization of poultry-processing work, with 200 immigrant Latino poultry workers.

Sampling and Recruitment

The sampling and recruitment plan for *JUSTA* has been described in detail elsewhere.¹⁶ Briefly, the research team

recruited current poultry workers in a 6-county area of western North Carolina, including Alexander, Burke, Caldwell, Surry, Wilkes, and Yadkin counties. This region has a total of 5 processing plants belonging to 3 companies. To be eligible, a respondent had to be (1) aged 18 years, (2) currently employed as a worker in a poultry-processing plant, and (3) self-identified as being of Latino ethnicity. The sampling plan called for 100 men and 100 women, with 100 located in Wilkes County; 50 in Burke, Alexander, or Caldwell counties; and 50 in Surry or Yadkin counties. In the absence of a census listing of all eligible poultry-processing workers, the team used a site-based sampling method to recruit a representative sample.²¹ Briefly, such an approach reasons that every person is a member of a residential group, or “site.” Sites can include residential enclaves, areas of high concentrations of workers, or dispersed residences, workers living apart from other poultry workers. If sites that vary across characteristics of the community (eg, being composed of single men vs families) are chosen and respondents are selected from a variety of sites, the resulting sample should reflect the variability in the community.

Project staff compiled a list of 41 residential enclaves in the study counties known to have a high concentration of Latino poultry workers. They identified residential enclaves with high proportions of poultry workers through a variety of ethnographic techniques including long-term presence in the study communities, interviews with leaders and advocates in the Latino poultry-processing community, and a series of 26 in-depth interviews with immigrant poultry-processing workers. Interviewers visited preidentified dwellings in each enclave and screened for individuals living in the dwelling. They recruited individuals meeting inclusion criteria and, when possible, interviewed them immediately. Respondents were recruited at all 41 enclaves proportional to the estimated number of eligible residents. Because not all workers live in enclaves, 70 workers who lived outside these enclaves were also recruited, proportional to the estimated population size. Interviewers explained the purpose of the study, the study procedures, and the risks and benefits of the study. They stated that the respondent would receive \$10 as a thank-you at the end of the interview. The interviewers answered any questions that the workers had and asked for consent to proceed with the interview. They gave the respondent an information sheet in Spanish with the same information on it that had been reviewed orally. The Wake Forest University School of Medicine institutional review board approved the procedure for obtaining informed consent. Only 5 eligible workers refused to participate in the survey, and all those who consented completed the interview.

Data Collection

Seven trained interviewers collected data in face-to-face interviews conducted in Spanish. All interviewers were native Spanish speakers familiar with the study counties. Interviewers participated in a one-day training, which covered interview techniques, questionnaire content, human subject

protection, and ethics. Interviewers were required to conduct a minimum of 2 practice interviews before beginning data collection for this study. Field supervisors collected and reviewed completed questionnaires on a weekly basis; 14% of respondents were recontacted to verify the interview. Interview content was developed from existing Spanish translations of questions and scales, where available. Two native Spanish-speaking staff carefully reviewed vocabulary and meaning using recommended guidelines for translation and back-translations.²² A third staff member fluent in Spanish then checked translations, and consensus was reached on all items where questions were raised. Translated items were then pretested in the target population to ensure that fidelity to the original intent of questions was retained.

Measures

Occupational Illness and Injury. We constructed variables reflecting 3 occupational health outcomes from a set of self-reported items. We assessed illness symptoms with 20 items found on several symptom inventories, such as the Cohen-Hoberman Inventory of Physical Symptoms²³ and the Quality of Well-Being, Self-Administered instrument,²⁴ asking whether the respondent experienced the symptom in the past month (yes/no). *Musculoskeletal problems* was coded 1 for respondents reporting “yes” to items about “pain, stiffness, cramps, or weakness in *neck or back*,” “pain, stiffness, cramps, or weakness in *arms, wrist or hands*,” or “pain, stiffness, cramps, or weakness in the *legs or feet*” in the past 30 days. *Respiratory symptoms* was coded 1 for respondents reporting “yes” to the items asking about “coughing or sneezing” or “shortness of breath or difficulty breathing” in the past 30 days. *Self-reported injury/illness* was assessed with a single question asking respondents, “In the past 12 months, how many times were you injured while doing poultry work or became sick because of your poultry work?” Individuals reporting one or more time were coded 1; otherwise, they were coded 0.

Organization of Work. We constructed variables capturing 2 management methods with health implications using items obtained from existing instruments. *Safety commitment* was measured with a validated 10-item Perceived Safety Climate Scale.²⁵ In this study, we used the 7 items focused on management practices related to safety (eg, “workers are regularly made aware of dangerous work practices and conditions”). Response options ranged from 1 (*strongly disagree*) to 4 (*strongly agree*). Items were summed with higher values indicating greater perceived management commitment to worker safety ($\alpha = .74$). We measured *abusive supervision* with an existing 7-item index²⁶ assessing the extent to which supervisors/managers use coercive tactics with their employees (eg, “my supervisor could make my work difficult for me”). Response options ranged from 1 (*strongly disagree*) to 4 (*strongly agree*). The items are summed with higher values indicating greater belief that supervisors/managers in poultry processing use coercive tactics ($\alpha = .75$).

We created several variables reflecting how jobs are designed and performed from items included in well-established instruments. Physical demands of the job were assessed with a 26-item shortened version of the Dutch Musculoskeletal Questionnaire, a global assessment of musculoskeletal workload.²⁷ Response options ranged from 1 (*seldom or never*) to 4 (*almost always*). Using data from 3 separate cohorts, Bot et al²⁸ demonstrated that the 26 items loaded on 2 distinct factors reflecting physical workload, long-lasting postures, and repetitive movement. In this study, we assessed the internal consistency of each set of items and dropped items with low item-to-total correlation, resulting in 9 items measuring physical workload ($\alpha = .83$) and 6 items measuring posture and repetitive movement ($\alpha = .79$). Items in each set were summed with higher values reflecting greater frequency of *physical workload* and *posture and repetitive movements*.

We used a modified version of the Job Content Questionnaire (JCQ)²⁹ to measure psychosocial elements of job design and performance. We modified the items to focus on the frequency with which each job-related item was experienced in general. We also modified the response categories to a 4-point frequency-based set ranging from 1 (*never or seldom*) to 4 (*almost always*). We assessed *authority* with 3 items tapping opportunities to exert control over work (eg, “How often are you allowed to make your own decisions about your work?”). Items were summed with greater values indicating greater frequency of exerting control over work ($\alpha = .79$). We operationalized *variety* using 6 items from the “skill discretion” subscale of the JCQ, tapping how jobs vary in content, location, and routine (eg, “How often do you do a variety of different things on your job?”). Items were summed with greater values indicating more variation in tasks and activities on the job ($\alpha = .72$). We assessed *psychological workload* with 9 items tapping the stressors or demands inherent in participants’ jobs (eg, “How often is your job hectic?”). Items are summed with higher values reflecting greater psychological workload ($\alpha = .76$).

Analyses

We performed all analyses using SPSS version 13 (SPSS Inc, Chicago, IL). We calculated univariate statistics, such as percentages and means and standard deviations, to describe the sample of poultry-processing workers and the organization of poultry-processing work. We computed Pearson correlation coefficients to evaluate the intercorrelation among indicators of work organization. Simple and multivariate logistic regression models were fit using data from the entire sample to examine associations among indicators of the organization of work and worker health outcomes. Multivariate models for each health outcome controlled for the effects of demographic (ie, age, gender, and years in the United States), primary job in poultry processing, and participant employer to account for clustering of data within employer. We used listwise deletion to accommodate the small amount of missing data. We added organization of

work variables to each multivariate model using a backward stepwise procedure based on likelihood ratio statistics to determine the added value of organization of work variables in predicting health outcomes while minimizing potential overfitting of the models. We estimated linear effects in the logistic regression models on the basis of substantial previous research indicating a linear association of organization of work variables with worker health outcomes.³⁰ Preliminary gender-stratified analyses yielded little evidence suggesting that tasks and subsequent exposures in the food-processing industry differed between women and men^{19,31}; consequently, the logistic regression models were fit using the combined data from both women and men.

RESULTS

Table 1 presents the demographic and occupational characteristics of study participants. All but 2 of the participants were born in a Latin American country. Participants were predominantly from Mexico (47.5%), but one-third of participants were born in Guatemala. Approximately 75% of participants have lived in North Carolina for 5 or more years, and 15% have been in the United States for fewer than 5 years. On average, participants were aged 33 years ($SD = 9.6$), women comprised half of the sample by design, and the modal level of education was primary, which is approximately equivalent to an elementary education in the United States. More than half of the respondents reported symptoms of musculoskeletal problems in the past 30 days ($n = 108$). Approximately 1 in 7 workers ($n = 29$) reported symptoms in the past 30 days suggestive of a respiratory problem. More than one-quarter of respondents ($n = 56$) reported an occupational injury or illness in the past 12 months.

Participants performed a wide range of poultry-processing tasks. The majority were involved in evisceration, cutting, and deboning tasks that occur in the early to middle stages of processing and involve working with raw carcasses as well as the use of knives and other sharp instruments. Approximately 1 in 5 participants worked in *packout*, or the stage of production that packages the processed product for shipping from the plant to consumers. Approximately 11% of participants were in sanitation and were responsible for cleaning the machinery and surfaces in compliance with Food Safety Inspection Services requirements. Another 11% of participants worked in other jobs, including forklift operator, quality control, and supervision. One-third of workers reported working in poultry processing for fewer than 2 years, but 20% had worked in poultry processing for more than 5 years. Nearly 90% of respondents reported working 40–45 hours per week in poultry processing.

Table 2 presents information describing management practices and how jobs are designed and performed in poultry processing. In terms of management practices, average scores for safety commitment fell at the midpoint of the possible range of scores, and the majority of poultry-processing

Table 1.—Demographic and Occupational Characteristics of Participants

Characteristic	<i>n</i>	%
Demographic		
Country of birth		
Mexico	95	47.5
Guatemala	66	33.0
El Salvador	25	12.5
Honduras	9	4.5
Other	5	2.5
Years in United States ^a		
≤ 4	31	15.5
5–9	86	43.0
10–14	51	25.5
≥ 15	30	15.0
Years in North Carolina ^b		
≤ 4	51	25.5
5–9	97	48.5
10–14	41	20.5
≥ 15	9	4.5
Age (y)		
≤ 24	33	16.5
25–29	46	23.0
30–34	46	23.0
35–44	49	24.5
≥ 45	26	13.0
Gender (female)	99	49.5
Education		
None	23	11.5
Primary	109	54.5
Secondary	42	21.0
Preparatory or higher	26	13.0
Occupational		
Years in poultry		
< 2	64	32.0
2–5	91	45.5
> 5	45	22.5
Job classification		
Receiving and killing	7	3.5
Evisceration	56	28.0
Cutting and deboning	48	24.0
Packout	44	22.0
Sanitation	22	11.0
Other	23	11.5

Note. *N* = 200.

^aMissing data on 1 male and 1 female respondent.

^bMissing data on 2 male respondents.

workers reported low levels of abusive supervision, as indicated by the mean and standard deviation falling below the midpoint of the possible range of scores. Turning to indicators of job design and performance, the majority of participants had a physical workload score below the midpoint of the possible range of values, but the average score for awkward posture and repetitive movements was above the midpoint. The average score for decision authority and variety were below the midpoint for their respective ranges and, when variation around the mean is considered, the majority of participants had values below the midpoint of the range for each variable. Average scores for psychological workload fell at the midpoint of the possible range of score.

Variables reflecting management practices and job design and performance in the poultry-processing industry were intercorrelated (see Table 2). Greater safety commitment, one indicator of management practices, was associated with less abusive supervision, less frequent awkward postures and repetitive movements, higher levels of control over work (*authority*), as well as less psychological workload. Abusive supervision, a second measure of management practices, was associated with greater physical workload as well as higher levels of control over work and variety in tasks. Nearly all of the indicators of job design and performance were intercorrelated. Greater physical workload was associated with more frequent awkward postures and repetitive movements, as well as more frequent control and variety at work, and greater psychological workload. More frequent awkward postures and repetitive movements were associated with less authority and variety at work and greater psychological workload. Finally, control in the workplace was associated with greater variety in job tasks.

Several organization-of-work variables were associated with worker health outcomes (see Table 3). All of the organization of work variables, except for abusive supervision and physical workload, were associated with reports of musculoskeletal problems in the past month in the bivariate analyses. However, only indicators of job design and performance remain significantly associated with musculoskeletal problems in the multivariate analyses. For every 1 unit increase in authority and variety, the odds of reporting musculoskeletal problems decreased by 19% and 8%, respectively. By contrast, for every unit increase in psychological workload, the odds of reporting musculoskeletal problems in the past 30 days increased by 11%. The association of abusive supervision with musculoskeletal problems approached statistical significance ($p < .053$). Safety commitment, abusive supervision, and posture and repetitive movements were each associated with recent respiratory problems in the bivariate analyses. However, in multivariate analyses controlling for demographic and occupational characteristics, only 3 organization-of-work variables remained following the backward stepwise procedure. A one-unit increase in abusive supervision was associated with a 13% increase in the odds of reporting recent respiratory symptoms. Trend-level evidence ($p < .10$) suggests that safety commitment and posture and repetitive movements may be associated with recent respiratory symptoms. Finally, although several organization-of-work variables were associated with self-reported occupational illness or injury in the past year in bivariate analyses, only 1 remained after the backward stepwise procedure controlling for demographic and occupational characteristics. For every 1-unit increase in psychological workload, the odds of reporting an illness or injury in the past year increased by 12%.

COMMENT

Poultry processing is dangerous, demanding work resulting in consistently high rates of occupational illness and injury.^{1,5}

Table 2.—Descriptive Statistics and Intercorrelation of Organization-of-Work Variables Among Poultry-Processing Workers

Variable	<i>M</i>	<i>SD</i>	Range	1	2	3	4	5	6	7
1. Safety commitment	18.59	4.19	9–27	—						
2. Abusive supervision	13.24	4.35	7–28	-.14*	—					
3. Physical workload	17.02	6.91	9–36	-.05	.20**	—				
4. Posture and repetitive	18.12	4.93	6–24	-.35**	.03	.22**	—			
5. Authority	4.26	2.15	3–12	.14*	.16*	.19**	-.28**	—		
6. Variety	20.30	7.53	12–42	.08	.29**	.35**	-.22**	.37**	—	
7. Psychological workload	19.83	5.77	9–33	-.43**	.09	.32**	.52**	-.10	.10	—

p* < .05. *p* < .01.

Despite high rates of illness and injury in this sector of the manufacturing industry, little peer-reviewed research has documented the factors that contribute to variation in occupational health outcomes among poultry-processing workers in the United States. Drawing on a central theme of the National Occupational Research Agenda, we designed this study to determine whether factors reflecting the way poultry-processing work is organized are associated with occupational illness and injury. Given the relative absence of previous research focused on poultry-processing workers in the United States, a workforce that is increasingly foreign born, this article makes several contributions to the literature. In particular, it provides one of the first descriptions of the organization of poultry-processing work, and it documents potential health implications of the organization of poultry-processing work.

The results of this study present a mixed portrayal of management practices used in poultry processing. Management practices reported in the sample are perhaps best described in terms of “benign neglect.” Although there was little evidence of coercive or abusive supervisory practices, there was also little perceived commitment on the part of managers for workers’ safety. Indeed, the fact that most workers’ reports of safety commitment were located in the middle of the possible range of values suggests that very few participants reported strong agreement that statements about management practices being reflective of organizational commitment to safety were accurate. These results are consistent with historical reports of ongoing occupational safety and health problems in poultry-processing plants in North Carolina, as well as a recent report arguing that poultry-processing plants are hesitant to focus on safety, in part, because of cost concerns.¹²

The results also present a mixed portrayal of how poultry-processing jobs are designed and performed. Although workers’ appraisals of physical workload were generally low, they did report that their jobs frequently required long standing postures and repetitive motions. The evidence clearly suggests that poultry workers had few opportunities to exert control over how their work is performed and that workers had little variety in their job-related tasks. These results are consistent with a recent characterization of the

poultry-processing operation as being highly mechanized operation that requires workers to stand for long periods of time and perform repetitive movements.¹ However, in contrast to the Government Accountability Office’s characterization of poultry-processing work as stressful, workers did not report an excessive psychological workload. These results could reflect a “healthy worker” effect as well as the possibility that these immigrant workers developed effective strategies for coping with the inherent psychological demands of their work.¹² Jobs with a steady paycheck are needed to support family members both in the United States and at home. Yet for these workers, many of whom were undocumented, steady jobs are uncommon and difficult to obtain. Therefore, having any job is interpreted as less psychologically demanding than not having a job.³² Put another way, stressors inherent in the work are minimized because of the perception that “it could be worse.” If this interpretation is correct, the fact that workers minimize the demands of poultry-processing work may ultimately exacerbate health disparities because immigrant workers will continue to work in hazardous conditions.¹²

Our results linking different indicators of how poultry-processing work is organized to worker health outcomes also contribute to the literature, particularly in the relative absence of comparable research in the United States. Our results suggest that little task variety and elevated psychological workload are both associated with increased risk of musculoskeletal problems in the past 30 days. Greater psychological workload, which is heavily influenced by excessive line speeds and chronic ambient noise in the plants,^{1,32} was also associated with increased risk of self-reported injury or illness at work in the past year. These results parallel previous results from a French cohort of poultry-processing workers,^{18–20} as well as the broader occupational stress literature linking these concepts to a variety of health outcomes.^{8–11} This pattern of results also reinforces recommendations by the Occupational Safety and Health Administration for job rotation as well as calls for line-speed reductions.³³ Our results also suggest that management practices may undermine worker health. Our results provide evidence suggesting that management’s commitment to safety, at least

Table 3.—Bivariate and Multivariate Association of Management Practices and Job Design and Performance Indicators of How Poultry-Processing Work Is Organized With Occupational Health Outcomes

Variable	Musculoskeletal			Respiratory			Injury			
	OR ^a	95% CI	OR ^b	95% CI	OR ^b	95% CI	OR ^a	95% CI	OR ^b	95% CI
Management practice										
Safety commitment	0.87****	0.80–0.94	1.12	0.98–1.28	0.85***	0.77–0.94	0.87*	0.75–1.01	0.77****	0.70–0.85
Abusive supervision	1.02	0.95–1.08	1.09*	1.00–1.20	1.10**	1.00–1.20	1.13**	1.01–1.27	1.04	0.97–1.12
Job design and performance										
Physical workload	1.03	0.99–1.07			1.03	0.98–1.09			1.06***	1.02–1.11
Posture and repetitive	1.18****	1.10–1.26			1.13***	1.03–1.24	1.10*	0.99–1.22	1.20****	1.11–1.30
Authority	0.94***	0.91–0.98	0.81**	0.66–1.00	0.98	0.93–1.03			0.98	0.94–1.02
Variety	0.94***	0.90–0.98	0.92****	0.86–0.97	1.02	0.97–1.08			1.02	0.98–1.07
Psychological workload	1.15****	1.09–1.22	1.11****	1.02–1.19	1.07*	1.00–1.14			1.22****	1.14–1.30

Note. Multivariate models enter participant age, gender, years in the United States, primary job task in poultry processing, and employer in the first step. In the second step, organization of work variables are entered using backward stepwise selection based on likelihood ratio statistics. Multivariate models are based on data from 198 participants; 2 individuals had missing data on the number of years in the United States. OR = odds ratio; CI = confidence interval.

^aSimple, bivariate.

^bMultivariate.

** $p < .10$. *** $p < .05$. **** $p < .01$. ***** $p < .001$ (2-tailed).

as workers perceive it, may contribute to illness and injury in the workplace. In addition, the use of abusive or coercive supervision was a risk factor for respiratory problems. This association has not been documented in the literature so an explanation is not readily apparent; however, in our ongoing ethnographic study of these workers, we have heard that supervisors sometimes punish employees by assigning them unpleasant job tasks. The observed association may be picking up these management practices to the extent that these tasks contribute to greater exposure to dust, endotoxins, or molds. More research is needed to understand this association.

The results of this study must be interpreted in light of its limitations. First, we cannot make causal inferences because our results are based on cross-sectional data. Second, assessments of different aspects of work organization in poultry processing was based on self-report. Although evidence indicates that self-reported indicators of work organization are valid,^{33–36} reporting biases may affect assessments. It is worth noting that previous researchers have found that individuals in the same industry and in the same job title are exposed to different physical and psychological workloads.^{37,38} Thus, the within-industry variation in indicators of how poultry-processing work is organized observed in the study should not be interpreted as measurement error. Third, the survey relied on retrospective self-reports of injuries, rather than physical examinations or ongoing surveillance. Because retrospective data are subject to memory lapses, the reports of injuries presented here are likely underestimates. The fourth limitation is the use of a nonrandom sample. Drawing a random sample of immigrant Latinos, as well as other “hidden” populations,³⁹ is challenging because they are frequently undocumented and fearful of possible deportation, and there are no reliable listings of names that can be obtained. For these populations, more creative methods must be devised. The site-based sampling used here is a reasonable substitute, but one for which corroborating data would be useful. Finally, the usual method for studying occupational injuries—sampling from the worksite—was not possible because the poultry plants would not allow us to sample and recruit workers from their employee populations. This limits the generalizability of these findings.

Despite these limitations, the results of this study suggest that modifications in management practices and changes in how poultry-processing jobs are designed and performed may yield improvements in worker health. Specifically, employers can better protect worker health by clearly demonstrating a commitment to worker safety, executing job rotation policies to minimize exposure to repetitive movements and increase task variety, reducing line speed to minimize the psychological workload and repetitive movements, and avoiding abusive or coercive supervisory tactics. Additional research is clearly needed; nevertheless, this research presents preliminary evidence suggesting that the organization of work underlies the high rates of injury and illness among immigrant workers in poultry processing.

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