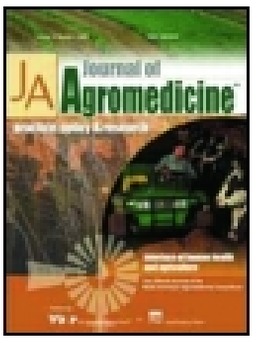

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ORIGINAL RESEARCH

Traumatic Injury Rates in Meatpacking Plant Workers

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ABSTRACT. This was a 3-year retrospective cohort study of traumatic injuries in a midwestern pork meatpacking plant. Based on n = 5410 workers, this was a diverse workforce: Caucasian (56.6%), Hispanic (38.9%), African American (2.7%), Asian (1.1%) and Native American (0.8%). There were n = 1655 employees with traumatic injuries during this period. At 6 months of employment, the probability of injury was 33% in the harvest workers who were responsible for slaughter operations. The overall incidence injury rate was 22.76 per 100 full-time employees per year. Women experienced a higher incidence for injury than men. The risk ratio (RR) for traumatic injury was significantly lower in Hispanic workers compared to Caucasians (RR = 0.54, 95% CI = 0.49–0.60) and nonsignificantly higher in African American and Native American workers after adjusting for age, gender, work section assignment, and experience (RR = 1.33, 95% CI = 1.21–1.47). These findings suggest that either Hispanics are very safe employees or they underreport injuries. We make the case for the latter in the discussion.

KEYWORDS. Work, injuries, meat processing

INTRODUCTION

Meat processing plants are highly organized facilities with complex operations. In order to keep food production costs low, these facilities use streamlined work processes but involve hazardous work conditions used in both the slaughter and cutting of the carcass as it passes by workers equipped with cutting knives and powered tools.[1] Meat processing is especially

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hazardous work for pork products because of the lard material processed, resulting in slippery surfaces, and the sheer lifting and pulling of the carcass associated with cutting operations.[2]

There are numerous environmental factors to consider in different sections of a meatpacking plant that facilitate injury risk, such as environmental extremes, slippery floors, and loading live animals. Many devices in the meatpacking plant can easily traumatize human tissue caught in machinery, the most extreme example of this being amputation of an extremity.[3] In pork processing there are jobs involving cutting operations such as band saws, meat grinders, cleavers, straight and wizard knives, and hooks that can cause lacerations and puncture wounds.[4] Frequent floor mopping to preserve a clean environment is associated with slips and falls.[5] In the slaughter area, employees herd live animals and may be stepped on or bitten. Stun guns used in slaughter operations may prematurely discharge, causing injury to employees.[6,7] Musculoskeletal injuries can result from repetitive motion with hand knives and lifting heavy boxes of meat.[8] Other injuries can result from rendering operations, shoveling, driving forklifts, and maintenance operations.[9,10]

The purpose of this study was to estimate the incidence rate of injuries in a meatpacking plant over a 3-year period of observation. Specifically, we wanted to evaluate the impact of age, gender, ethnicity, work experience, and work section on traumatic injury risk in a midwestern pork processing facility.

METHODS

Design

A retrospective cohort design was used to estimate injury incidence; the period of surveillance was 3 years in length (May 1, 2001, to April 30, 2004). Risk exposure was calculated from the date of hire or May 1, 2001, for existing employees. All individuals started at time "zero" for the hazard regression analyses. Person-hours at risk were used to calculate injury incidence.

Sample

Participants were from a midwestern meat processing facility with 5410 employees during the period of follow-up. This plant recruited workers from both Mexico and the United States (California, Arizona, and Texas). Employee turnover in this facility was 65.7% per year.

Materials

Data sources included human resource data, injury reporting forms, and clinical records. There were some restrictions on the data released to researchers; specifically, there was no data on the environmental conditions when the injury occurred or individual time records used for processing salaries. The research protocols were reviewed by the Institutional Review Board for Human Subjects at the University of Iowa and a formal contract for data release was signed after 8 months of legal negotiations between the investigator and the corporate attorney.

Sociodemographic Data

Gender and ethnic classification were based on a job application form the employee completed. Age was calculated based on birthdates at the start of employment. Years of experience were calculated for work experience in this plant only.

Injury Case

A case was deemed an injury if a trauma event identification number (ID) was assigned by the occupational health nurse who was located on-site either at the time it was reported or the following morning or Monday if it was an evening, night, or weekend injury. Only work-related injuries were used for this analysis.

Job Assignment

There were more than 300 specific job titles and many of the jobs were detailed to the point of specifying the production task and line position; therefore, a comprehensive listing and analysis was cumbersome. However, we did analyze high-risk job assignments and identify those based on the number of injuries by job

listing. There are two job titles worth describing as examples of the titles used: the "snatch worker" and the "lard puller." The snatch worker removes the visceral organs from the carcass. A lard puller reaches into the rib cage of the pork carcass and removes the fatty material lining the thorax. Job titles are important to employees; they bid on a job to either find a production task that is less physically demanding or to obtain a higher hourly wage. For example, the less desirable jobs similar to those previously described are physically demanding and pay more.

Work Sections

Classifications of employees into a work section (harvest, cutting, production, support) were based on the employer's human resource management data fields in order to prevent classification error. Each of these work sections tends to cluster individuals of similar job titles or production tasks, but employees in these work sections also have additional environmental exposures. The major work sections are

- Harvest. Live animals are hoarded into the harvest section so the plant temperature is acclimated to the outdoor weather; in the summer this may get as high as 95°F and winter temperatures could be near 25°F. Once the animals are killed, the blood is drained and the carcass is eviscerated. Before exiting the slaughter area, the gutted carcass goes through a heat-searing procedure to burn the hair from the pig skin.
- Cutting. In the cutting section, the carcass is divided into two symmetrical halves. As it moves down the line the meat is processed into specific meat products with tailored cutting as dictated by corporate customer orders. For example, this could involve bone-out procedures and producing hams or ribs. In the cutting work section, the temperature is consistently 42°F to 45°F to preserve the meat as it is processed.
- Production. In the production area, meat is weighed and portioned, packaged, and frozen or refrigerated depending on the time to market for that particular product. Attention is given to the final inspection, physical appearance, and portion size; some employees are exposed to lifting and moving of boxes onto pallets or working in cold temperatures where the meat is stored until it is shipped.
- Support. In this work section, employees are not directly involved in meat processing tasks. Although not all inclusive, the support section includes the industrial engineer, occupational health service staff, human resource managers, quality assurance employees, safety personnel, and clerical workers.

Data Analysis

The incidence rate was calculated using the employed hours estimate for each individual worker; the summary measures were based on 200 000 person-hours at risk, a commonly reported Occupational Safety and Health Administration (OSHA) statistic that is equivalent to 100 person-work years where 2000 hours constitute one work year. The probability of injury was computed using the Kaplan-Meier estimate, which has been used in workplace injury research and described elsewhere.[5,11] An assumption under this model is that at the start of follow-up there are no injuries. Any employee with a work injury prior to May 1, 2001, was not counted as a case.

The proportional hazards (PH) model is commonly used in hazard regression to estimate the risk ratio (RR) and 95% confidence intervals (CI).[12] This likelihood-based regression procedure estimates the RR in a "time to event" type concept, where in the multivariate model coefficients are estimated in the form of

$$\lambda(t \mid z) = \lambda_0(t)\exp(\beta^T z)$$

In the above example, $\beta = (\beta_1 \ldots \beta_p)^T$ is the vector for the regression coefficients and $\lambda_0(t)$ denotes the baseline hazard function.

Censored Observations

The rationale for using hazards regression was the high employee turnover that resulted in substantial censored observations during the 3 years of follow up.[13] Censored observations

occur whenever the dependent variable (ie, the time to a traumatic work-related injury) is interrupted with some extraneous event such as an employee quitting his job or moving out of the geographical area. Data on why an employee was terminated was not available to the investigators, but common reasons in this plant were problems with the employee's immigration status and job dissatisfaction (ie, wages and working conditions). Reasons for termination by the employer primarily related to safety issues such as failing to follow a procedure properly and employee altercations or violent outbursts related to cultural misunderstandings.

RESULTS

Employees reported 1655 injuries to the on-site occupational health clinic in this pork facility. Using 200 000 person-hours at risk, the incidence rate of traumatic injury overall was 22.76; it was highest in the 18-year-old to 24-year-old group and lowest in the greater than 50-year-old group as displayed in Table 1. Using the greater than 50-year-old group as baseline, both the 18-year-olds to 24-year-olds (RR 2.12, 95% CI = 1.47-2.18) and the 25-year-olds to 50-years-olds (RR = 1.32, 95% CI = 1.05–1.52) had a higher risk of injury than the reference group. Women (n = 1896, 35.1%) represented a sizable portion of the employee workforce and experienced a slightly higher injury rate (22.65/200 000 person-hours) compared to men (17.55/200 000 person-hours, RR = 1.29, 95% CI = 1.17–1.42).

Ethnic groups represented in this pork processing facility were Caucasian (n = 3052, 56.6%), Hispanic (n = 2113, 38.9%), African American (n = 145, 2.7%), Asian (n = 59, 1.1%), and Native American (n = 41, 0.8%). When computed by ethnic group (age-adjusted) using Caucasians as baseline, the risk ratio was significantly higher among African Americans (RR = 1.55, 95% CI = 1.09–2.21) and nonsignificantly higher in Native Americans (RR = 1.75, 95% CI = 0.97–3.22). In contrast, Hispanic workers had a significantly lower age-adjusted risk of injury compared to Caucasians (RR = .88, 95% CI = 0.64–0.99).

Worker Experience

Many employees in this sample had less than 1 year of experience at the plant (n = 2847, 52.6%). There was a general pattern of employee turnover as evidenced by the remaining employees when classified by work experience with those having 1 to 5 years (n = 1760, 32.3%) and those with greater than 5 years (n = 803, 14.8%). Using the greater than 5 years of experience as the reference group for traumatic injuries, both the less than 1 year of experience group (RR = 2.04, 95% CI = 1.75–2.38) and the 1 to 5 year group (RR = 1.51, 95% CI = 1.30–1.71) had significantly higher injury risk.

Gender and ethnicity stratification on work experience revealed that women had a slightly

TABLE 1. Injury Incidence Rate by Age and Ethnic Group

	N (%) Employees	Total Risk Hours	N Injured	Injury Rate*
Age group				
18–24 Years	1702 (31.3)	2 952 697	519	35.15
25–50 Years	3293 (60.8)	9 191 954	1011	21.99
>50 Years	415 (7.9)	1 510 246	125	16.55
Ethnic group				
African American	145 (2.7)	237 977	46	38.66
Asian	59 (1.1)	223 468	24	21.48
Caucasian	3052 (56.6)	8 387 904	1055	25.16
Hispanic	2113 (38.9)	4 733 097	516	21.80
Native American	41(0.8)	72 451	14	38.63

*Injury rate based on 200 000 person-hours at work.

lower in the under 1 year experience group (n = 926, 49.1%) than men (n = 1921, 54.5%), but there was no statistical difference when analyzed by mean years. However, there were significant differences on years of experience by ethnicity (F = 122.6, p < .001). Hispanics had fewer years of experience (mean = 1.21 years, SD = 1.31) than Caucasians (mean = 3.49 years, SD = 4.83) and Asian workers had the highest longevity (mean 4.98 years, SD = 5.31), with African Americans (mean = 1.29 years, SD = 2.67) and Native Americans in between (mean = 1.42 years, SD = 2.53).

Work Section

Ethnic differences existed in the distribution of employees across the four work sections. For example, Hispanics accounted for 38% of the plant's workforce but only 2.9% (n = 6) of the support section (n = 204). Most of the employees in the support section were Caucasian (n = 193, 94.6%). Of the 3610 employees in the cut section, there were 1919 Caucasians (53.2%), 1535 Hispanics (42.5%), 88 African Americans (2.4%), 40 Asians (1.1%), and 28 Native Americans (0.8%). The distribution and percentage of workers were similar in the harvest section but differed in the production section, where 75.1% were Caucasians.

Gender and age were also considered in the work section analysis. Women were mostly located in the support section (49%) but distributed throughout the plant in the cut (37.8%), harvest (26.9%), and production (24.2%) sections. When age was stratified by work section, significant differences existed (f = 18. 18.46, p < .001) with the older employees in the support work section (mean = 37.15 years, SD = 11.23), followed by production (mean = 34.60 years, SD = 10.66) and cut (mean = 32.56 years, SD = 11.31), and the youngest in the harvest section (mean = 31.65 years, SD = 10.69).

Figure 1 highlights the cumulative probability of first injury by number of work exposure hours. At 1000 hours (6 months of work exposure) the probability of injury was about 33% for harvest workers, significantly higher than the other work sections. Total risk hours and injury rate by work section are displayed in Table 2. The fewest number of injuries occurred in the support section, which included supervisors, white-collar workers, buyers (employees who purchase animals for slaughter), and those with more technical training in skilled jobs. Most of their 36 reported injuries were sustained by hourly-paid supervisors (n = 22, 61.1%), buyers (n = 3, 8.3%), and electronic technicians (n = 3, 8.3%). Of the 53 job titles in the support section, 44 (83.3) were injury free. These included

FIGURE 1. Injury probabilities by work section (1000 hours is approximately equivalent to 6 months employment). Chi-square = 78.9, df = 3, p < .001 (also see injury rates in Table 2).

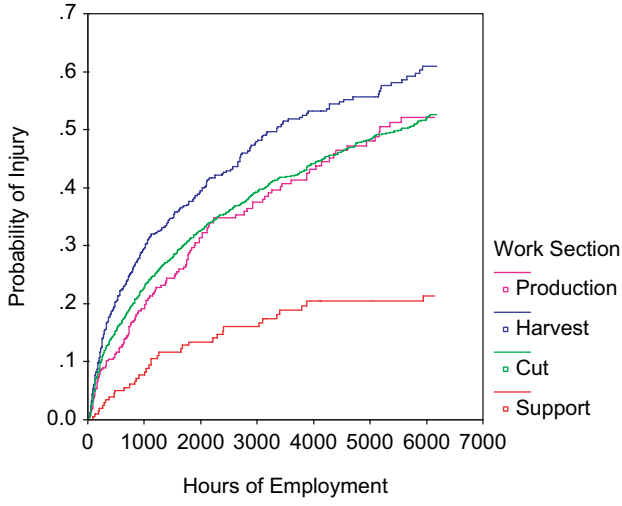

TABLE 2. Injury Incidence Rate by Work Section

	N (%) Employees	Total Risk Hours	N Injured	Injury Rate*
Support	204 (3.8)	915 525	36	7.86
Harvest	1195 (22.1)	2 577 697	408	31.65
Cut	3610 (66.7)	8 936 537	1079	24.15
Production	401 (7.4)	1 225 137	132	21.54

*Injury rate based on 200 000 person-hours at work.

positions like environmental superintendent, training supervisor, and safety and health staff.

The highest incidence of injuries (n = 408) was found in the harvest or slaughter work section, where the employees most at risk were "general operator—kill" (n = 69, 16.9% injured) followed by "snatch workers" (n = 23, 5.6%) and "leaf lard pullers" (n = 7%). Of the 89 job titles in this section, only 11 (12.4%) were injury free during the period of observation. Of the 1080 injuries in the cut section, the second highest injury rate were employees assigned to the "cut—general worker" job title (n = 75, 7.0%) followed by "skin and end trimmer, ham bone" (n = 53, 4.9%), "bag packer—general" (n = 51, 4.7%), and the "mark hams" workers (n = 35, 3.2%). Of the 198 job titles in this section, only 30 (15.2%) were injury free. The production department had 132 injuries, the jobs with the highest number being "open worker" (n = 28, 1.18%) and "cut bone butt" (n = 14, 10.6%). Of the 39 job titles in this department, 12 positions (30.8%) were injury free.

Proportional Hazards Model

A multivariable model for injuries is displayed in Table 3. Adjusting the risk ratios (RR) for ethnicity, gender, age, worker experience, and work section produces an RR for Hispanics that is lower than the age-adjusted univariate estimate, especially when one considers the number of Caucasians in low-risk injury jobs. Asian, African American, and Native American RRs were nonsignificant relative to Caucasian employees. Risk of injury was statistically higher in those aged 18 to 24 years relative to those older than 50 years, in women, in the harvest work section relative to the production department (the support work section had

TABLE 3. Multivariable Model for Traumatic Injuries in Meat Processing Workers*

Variable	B	SE	Wald	Df	p	RR (95% CI)
Ethnic group			125	4	<0.001	
Caucasian						1.00
Hispanic	–.0622	.057	118	1	<0.001	0.54 (0.49–0.60)
Asian	–.0199	.207	0.92	1	.337	0.82 (0.55–1.23)
African American	0.097	.152	0.41	1	.523	1.10 (0.82–1.49)
Native American	0.181	.269	0.45	1	.501	1.20 (0.71–2.03)
Sex						
Female	0.287	.051	31.8	1	<0.001	1.33 (1.21–1.47)
Age			12.9	2	.002	
>50 Years						1.00
18–24 Years	0.322	.104	9.59	1	.002	1.38 (1.13–1.69)
25–50 Years	0.154	.096	2.59	1	.108	1.17 (.097–1.00
Work experience			89	2	<0.001	
>5 Years						1.00
<1 Year	0.808	.086	88.4	1	<0.001	2.24 (1.89–2.65)
1–5 Years	0.547	.074	54.0	1	<0.001	1.73 (1.49–2.00)
Work section			71.6	3	<0.001	
Production						1.00
Support	–1.055	.189	31.1	1	<0.001	0.35 (0.24–.050)
Cut	0.100	.094	1.14	1	.286	1.11 (0.92–1.33)
Harvest	0.354	.102	12.1	1	.000	1.42 (1.16–1.74)

*B indicates beta estimate; SE, standard error; Df, degrees of freedom; RR, risk ratio; CI, confidence interval.

statistically lower risk), and in those with less than 1 year of experience relative to the baseline group with greater than 5 years of work experience. The interaction term age*work experience was not significant and did not impact on the other variables; thus, it was excluded from the final model.

DISCUSSION

Age, gender, and ethnicity variables were analyzed for injury risk in employees for this pork processing plant, and each of these sociodemographic variables revealed statistical differences. Younger workers (ages 18 to 24 years) experienced the highest injury rate in this sample; older workers (ages greater than 50 years) had the lowest rate. This is most likely a function of older workers bidding on jobs they found less physically demanding and less hazardous, but other explanations are possible, including a higher rate of turnover in the younger worker group. Employee turnover was also reflected in the lack of significance for the interaction term age*experience; in many types of occupations, the longer one works at a given task, the more experience one acquires. In this sample, the greater than 5 years' experience group was the smallest group.

Gender and ethnicity findings revealed significant associations with injury risk. Women had a higher risk of injury relative to men, and this risk persisted after adjusting for age, ethnicity, work experience, and work section. Injury risk in Hispanics was significantly lower compared to Caucasians, and African Americans had a higher risk ratio. The African American significance was lost in the multivariate model; thus, work section, age, and gender explained most of the risk in that group. However, the Hispanic risk ratio was significantly lower in the multivariate model, so work section, age, and gender did not alter that finding.

There are two possible explanations for the Hispanic injury risk found here: either Hispanics are less injury prone in their work and perform tasks more safely than Caucasians or there is underreporting of injuries in this ethnic group. The multivariate model is extremely important in understanding this phenomenon, in that Hispanics have lower risk ratios across all work sections, all age groups, and regardless of gender. We are convinced that this is underreporting of work-related injuries in Hispanic workers.

Workers in meatpacking have one of the highest occupational injury rates in the United States. The US Bureau of Labor Statistics reports injury incidence rates in meatpacking between 14.7 to 29.5 per 100 full-time workers,[14,15] which compares accurately to the incidence of 22.76 found here. Cai et al[9] studied lacerations reported to OSHA in two meatpacking plants and found the rates variable between facilitates, but in a plant with a slaughter department similar to the facility in this sample the rate was 8.3 to 14 lacerations per 100 full-time workers. Excluding other types of trauma, the Cai et al study found that laceration hazards vary across time into shift, task being performed, and type of tool being used. We failed to analyze time and did not have the environmental conditions at time of injury data to complete this type of analysis. However, we were able to document the rapid time to injury in terms of days of employment by work section, especially for employees working in the harvest work group, where most of the slaughter operations are carried out.

Our analysis on gender found a higher age and work section–adjusted risk of injury for women. Women were self-selecting out of the more hazardous work sections as evidenced by their representation of roughly half the support section. Many of the work assignments women were occupying in the cut and harvest sections are demanding from a functional perspective; lacerations, muscle sprain, back injury, and repetitive motion injuries can often result. One study found that female meat processing workers may be more prone to repetitive motion injuries when working in temperature extremes.[16] However, little has been written about women in this industry in the peer-reviewed literature, although there are many articles published by human rights groups and labor unions. This study lends some scientific credibility to these less documented reports.

Similarly, ethnic group differences in meatpacking are seldom reported in the medical literature. Newspaper accounts of case studies and the media attention focused on immigration have drawn attention to the problems in the meatpacking industry relying on minority labor. Ethnicity was an important factor in describing injury risk in this analysis, with Hispanics demonstrating the lowest risk ratios. In previous studies of general health care, Hispanics were more likely to require insurer authorization for off-site office visits for work-related injuries than non-Hispanic workers.[17,18]

There is some discussion in the literature that Hispanic workers are less likely to report a workplace injury because of a fear their employment may be terminated.[19,20] When it comes to workplace safety, undocumented workers may have a perception that they will face discovery if they report an injury or seek medical care. This is exemplified in a study of minority youth on workplace injuries; when the questionnaires were distributed under the condition that fear of termination was removed, Hispanic teens were found to report more work-related injuries than Caucasian teens.[18] This is a very real concern in the plant studied here. Recently, inspections of processing plants by the United States Citizenship and Immigration Services (USCIS) in the midwest have made national headlines. In this particular geographical area, one USCIS raid resulted in the detention of approximately 10% of the Hispanic employees in nearby plants. It is our opinion that fear of being seized by authorities, along with other cultural factors, influenced the reporting of work-related injuries in Hispanic workers in this particular sample.

In general, the non-Hispanic or Latino ethnic groups (ie, Caucasian, African American, Native American, and Asian) in this plant were not first-generation immigrants, so language was not problematic for these workers. On the other hand, many Hispanic workers required a translator when interacting with plant managers, supervisors, and occupational health personnel. It is possible that some employees disliked speaking to their supervisor when a third party was present, whereas other ethnic groups could speak English and communicate privately with their team leader. These types of situations could have explained at least some of the reporting behavior if one assumes underreporting was truly a reason for our findings. We also know that there are numerous cultural misunderstandings that have resulted in employee violence in this plant. It is a qualitative observation only, as altercation data between employees were not provided to the research team and we do know that employees had been dismissed because of such violent outbursts.

Work assignments were also a factor in explaining some of the injuries. Figure 1 plotted injury probabilities by work section and demonstrated the relatively high injury rates within 6 months of work exposure in the harvest group, followed by slightly lower injuries in the cut and production sections. The support section experienced a markedly reduced risk of injury as would be expected given the types of work involved. While Hispanics held more jobs in the injury-prone work sections such as cut and harvest, Caucasians tended to work in the support and production work areas. There was no aggregate pattern of distribution for the Asian, Native American, or African American workers in terms of work sections.

Too much can be read into this observation of ethnic clumping of employees in work section, so we express caution in doing so. However, as previously described, employees do have some control over their work assignment due to the bidding process, and there is a comfort in having coworkers of similar ethnic background in one's place of employment. Positions in the harvest section, where many minorities and younger people are employed, had the highest incidence of injury. It was very clear to the workers that the harvest section had the higher hourly rates and these jobs paid more.

We know that the job titles are a bit difficult to follow in the results section of the article, but we want to publish these because clinicians working directly in the meatpacking industry will be able to approximately translate these to positions on the production line in their plants and pinpoint specific injury risks. Job titles associated with injury in the harvest or slaughter department were "general operators—kill, snatch workers, and leaf lard pullers." General operators

in the kill area are responsible for slaughter and can easily be trampled or bitten by an animal. These "kill" workers can be pinned against a fence or railing and are prone to bruising and abrasions. The "leaf lard puller" uses a hydraulic device to grasp the lard that can easily traumatize the worker; they are also prone to lacerations from nicking a rib bone and tendonitis of the wrist. Snatch workers gut the visceral organs from the carcass and are more likely to injure themselves with a muscle strain of the upper extremity. These are jobs that also require heavy shoveling, such as in rendering operations, and can easily cause musculoskeletal injuries from falls associated with slippery surfaces.

Cut section jobs including "general cut worker" and "skin and end trimmer, ham bone" are injury-prone positions because workers are in close physical proximity to each other on the production line with knives where they can easily injure themselves or each other. The "general-cut worker" rotates to all jobs in this section, putting him at risk for lacerations. Other cut section jobs are prone to cumulative trauma injuries. For example, the "bag packer—general" worker has to lift approximately 30 pounds on a repetitive basis, which is one reason why this position ranks in the top three hazardous jobs of this work section.

It is our opinion that the clinical implications are numerous and a comprehensive detailing of preventive strategies is beyond the scope of this article. For example, more safeguards could be implemented in the harvest work section where there is herding of live animals, and more "wide and sweeping" cuts to the carcass could result in lacerations[9] and puncture wounds.[4] Also, high-pressure washing of floor areas with strong cleaning agents could result in abrasive and burn injuries.[14] Steel-toed boots and better spacing of the line workers would prevent some injuries. Safety personnel need to consider the ergonomic aspects of the workplace for women and consider environmental risk factors, such as temperature, in preventing injuries.[16]

Most important clinically is how do we address the issue of minority workers in reporting injuries to their supervisors and to safety personnel when they may be "at risk" legally on their work permit status? This discussion is mainly about Hispanic workers, as this is our assumption in explaining the low injury risk finding reported here. Injured workers from some Hispanic and Latino cultures are reluctant to report injuries not only to their employer but also to family members. There are a number of reasons for this behavior, including not understanding how severe the injury really is, knowing their family may worry, and a feeling of shame and failure in letting the family down when they depend on the worker financially.[17] It is beyond the scope of this article to explain all of the social, cultural, and political complexities of this problem and how to facilitate trust between workers and clinical providers when accessing the health care system. However, this article is a beginning point in the objective description of the problem in the meatpacking injury.

LIMITATIONS

Data for this analysis is from one plant and should not be generalized to all workers or all minority groups in the meatpacking industry. Incidence rates in this report were calculated on estimates of work hours because the authors did not have actual time records for employees, but the procedures used here would conservatively underestimate injury incidence. We also had no data on work experience outside of this plant; employees who had worked in meatpacking prior to taking jobs in this facility would not have those dates articulated in this calculation.

CONCLUSION

Employees with the least experience were at the highest risk of injury. Hispanic injury risk was significantly lower than other ethnic groups, and women had higher injury risk than men. We also found higher rates of injuries in specific work sections, particularly the harvest section, with more women and Caucasians represented in the support section.

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