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A Cross-sectional Study of Gender-related Differences in Reporting Fatigue and Pain among Latino/A Migrant Farmworkers

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ABSTRACT

Objectives: Migrant farmworkers face many hardships in both their working and living environments including dangerous and demanding tasks, long hours, and inadequate rest. This study sought to explore gender differences in the reporting of fatigue and pain and to identify predictors of fatigue and pain among migrant farmworkers in Nebraska (n = 241).

Methods: Bivariate tests were used to assess associations among study variables. Linear and generalized linear mixed effect models were used to assess gender as a predictor of fatigue and pain respectively while controlling for covariates.

Results: Females reported significantly higher levels of fatigue (*M* score = 15.5, *SD* = 6.1 compared to *M* score = 12.8, *SD* = 4.3) than their male counterparts. Females were also more likely to report pain (56.9% of females compared to 36.3% of males). Being female, pain, hours of sleep, and job demands were significant predictors of fatigue. Fatigue and job-related injury were the only significant predictors of pain.

Conclusions: There are gender-related disparities in the reporting of fatigue and pain among Latino/a migrant farmworkers. Extra precautions need to be taken to protect worker health and safety and reduce fatigue, particularly for female workers. Implications for employers, supervisors, and healthcare providers are discussed.

KEYWORDS
Fatigue; pain; agricultural workers; Latino/Hispanic; Midwest

Introduction

There are approximately 1.4 million migrant and seasonal farmworkers in the United States.[1] Migrant farmworkers are economically disadvantaged, have limited social mobility, and are considered a vulnerable population by the National Institute for Occupational Safety and Health (NIOSH).[2] Farmworkers face elevated risks of illness and injury from a variety of occupational and environmental exposures[3] such as demanding tasks, long hours, toxic chemicals, dangerous machinery, and extreme weather conditions.[4] Not only is cultivating and harvesting crops physically demanding work, it can also take a toll on a person's psychological and emotional well-being due to high levels of stress, low financial renumeration, and being geospatially isolated.[5,6] All of these factors may contribute to an increased risk of fatigue and pain among farmworkers.

Women are an important farmworker population, but little is known about their occupational context. Agricultural health and safety studies have often overlooked the importance of gender; however, gender may influence both health behaviors and health outcomes. Even though women working in agriculture are exposed to many of the same occupational hazards as men, they have some unique risk factors. For example, women are more likely to be employed in seasonal work[7] and perform tasks that require frequent and repetitive motions, while men tend to perform tasks that require forceful exertions.[8] Women may not know of the occupational risks involved in specific tasks, because they are less likely to receive any type of job-related training.[9] Female farmworkers may also have the double burden of

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juggling farm work plus household chores including raising a family.[8,10,11] As such, they may be at an increased risk for fatigue and pain.

Fatigue

Fatigue is prevalent among U.S. workers.[12] According to the National Safety Council, "Fatigue describes the feelings of tiredness, sleepiness, reduced energy, and increased effort needed to perform tasks at a desired level.[13]" Some of the major risk factors for fatigue include physically or mentally demanding jobs, long shifts, working more than 50 hours per week, irregular hours, repetitive tasks, lack of adequate sleep, lack of rest breaks, and limited recovery time between shifts.[13,14]

Fatigue can negatively affect a person's quality of life.[15] It can result in decreased cognitive performance and affect a worker's ability to make safe decisions on the job.[12,13] About 13% of all workplace injuries can be attributed to fatigue.[16] Fatigue also affects productivity.[17] It is estimated that health-related lost productive work time from fatigue costs employers in the United States almost $136.4 billion annually. Workers with fatigue may report more pain, physical health problems, and poorer social functioning than workers who are not fatigued, thereby resulting in a lower quality of life.[12]

Because of the physical and routine nature of farm work, many migrant farmworkers may suffer from fatigue. They regularly work in extreme weather conditions, [18] sometimes more than 12 hours per day with few breaks or downtime.[19] Adequate recovery may not be possible, and sleep quality may be affected by work conditions such as exposure to pesticides and constant heat.[11,20] Hennebry et al. found that 64.9% of the 576 migrant farmworkers interviewed reported fatigue and associated it with working long hours, the intense pace of work, and constant pressure to meet and exceed work targets.[21] Although there have been a number of studies that address factors that may be associated with fatigue, the concept of fatigue itself has received relatively little attention in agricultural safety and health research.[22–24]

Pain

Although new technologies have changed production agriculture, there is still a need for manual labor. Farmworkers are often engaged in repetitive, physically demanding tasks, including having to work in awkward positions over long periods of time as well as lifting and moving heavy loads.[23–25] Occupational injuries are a common source of pain among farmworkers and as such are sometimes viewed as a consequence of hard work.[26] According to data from the U.S. Bureau of Labor Statistics, in 2017 there were 5.2 recordable cases of injury and illness per 100 full-time workers in agricultural crop production (North American Industry Classification System [NAICS], code 111) and 1.6 cases per 100 full-time workers involved lost work time.[27] A previous study in Nebraska found that about 20% of Latino migrant farmworkers had experienced an occupational injury.[19] Pain resulting from these injuries may affect a farmworker's ability to complete specific work-related tasks, participate in daily activities, or engage in self-care.[28] In a recent study of manual working farmers in India, pain was associated with gender and fatigue.[29] Unfortunately, there is limited research on pain among migrant farmworkers, particularly nonspecific chronic pain (i.e., pain not attributed to a recognizable or known pathology such as musculoskeletal issues). As the farm workforce ages, understanding more about the specific predictors of such pain will become critical to developing effective intervention strategies to prevent and reduce exposure to activities that may induce pain.

Purpose of present study

Limited studies address fatigue and pain among migrant farmworkers, particularly those that report findings by gender.[30] Additionally, no studies focus specifically on farmworkers in the Midwest. Regional information is important because the conditions of farm work vary by location and what is being produced. For example, the health and safety risks from sorting seed corn in a warehouse in the Midwest may differ from the risks associated with picking oranges in the South. Understanding what factors are associated with fatigue and pain is essential for improving farmworker health and being able to differentiate these experiences between Latino/a farmworkers. Therefore, the purpose of this study was to explore

gender-related differences in the reporting of fatigue and pain and to identify the predictors of fatigue and pain among migrant farmworkers in Nebraska. We hypothesized that there would be a high prevalence of both fatigue and pain among this worker population and that women would report significantly higher levels of both.

Methods

The data presented were drawn from the Nebraska Migrant Farmworker Health Study 2016, which assessed physical, behavioral, and social health and well-being of Latino/a migrant farmworkers in the state of Nebraska.[31]

Procedures

The research team worked in collaboration with trusted community partners from the Nebraska Migrant Education program and Proteus, the local administrator of the National Farmworker Jobs Program, to hold meetings at migrant farmworker camps where migrant farmworkers were living. Such meetings were held in ten central and eastern Nebraska counties where there was the largest concentration of migrant farmworkers in the state. During these meetings, a member of the research team described the study and eligibility requirements, discussed the rights of research participants, and answered any questions.

To be eligible to participate in the study, individuals had to be at least 19 years-of-age (the legal age of majority in the state of Nebraska), self-identify as Hispanic or Latino, and be currently employed as a migrant farmworker in Nebraska. A migrant farmworker was defined as an individual who temporarily lived in Nebraska because he or she was engaged in seasonal farm work and was unable to return to his or her permanent residence within the same date.

Farmworkers who were eligible and interested in participating in the study were then interviewed by a member of the research team in as private a location as possible. Face-to-face interviews were selected for use due to the anticipated low level of literacy and comprehension of a written questionnaire. Interviews were conducted in either English or Spanish based on the workers' preference, and informed consent was obtained from each worker prior to beginning the research interview. Interviews were based on a questionnaire consisting of 208 questions that addressed general health, work context, stress and emotional health, social health, and demographics. This questionnaire consisted of valid and reliable measures to the extent possible. Interviews typically lasted between 45–60 minutes, and participants were given $15 cash for their time. Data were collected between July and September 2016, and a total of 241 migrant farmworkers participated. Interviews were anonymous. No personal identifiers such as name, contact information, or company/crew name were collected; therefore, data cannot be linked to any specific participant. This study was approved by the Institutional Review Board at the University of Nebraska Medical Center.

Measures

Fatigue

Previous studies have found that fatigue should be measured as a unidimensional construct within a working population.[32] Therefore, fatigue was assessed using six items from the Iowa Fatigue Scale.[15] Participants were asked, "Please mark the response that best indicates how you felt during the past month." Then they were provided the following statements: "I felt worn out", "I felt slowed in my thinking", "I had trouble concentrating", "I felt drowsy", "I had low output", and "I had trouble with my memory." Participants could respond "not at all" (1), "a little" (2), "moderately" (3), "quite a bit" (4), or "extremely" (5) for each statement. A total score for the scale was derived by summing the scores of all items, with possible scores ranging between 6 and 30. The total score was analyzed as a continuous variable and was found to have adequate reliability in this sample, Cronbach's $\alpha = .83$.

Pain

Chronic pain was assessed by the question, "Do you have any body parts that cause you consistent pain?" The question referred to pain at the time of interview and was similar to the body diagrams that are used to indicate physical pain or discomfort in clinical interactions. Response options were categorical and included head/neck, eye, chest/

trunk, back, arm/shoulder, finger(s), hand/wrist, leg/knee/hip, toe(s), or foot, and "other" where participants could specify the body part that caused them pain if it was not part of the available response options. In this analysis, pain was used as a dichotomous variable. Participants who responded that they had pain in any body part were coded as having pain (1), and those who responded that they did not have any pain were scored (0).

Covariates

Covariates included age, years working in agriculture, length of time as a migrant farmworker, number of hours worked per week, nativity, relationship status, education, household income, job-related injury, average hours of sleep, job demands, self-rated health, and healthcare access. Age and years working in agriculture were measured as continuous variables. Length of time as a migrant farmworker was categorical and consisted of < 1 year (0), 1–4 years (1), and 5 or more years (2). Number of hours worked per week was measured as a continuous variable. Nativity was categorical, and responses were grouped into born in the United States (0), Mexico (1), or other (2). Relationship status was categorized as married (0), separated or divorced (1), member of an unmarried couple (2), and never married (3). Level of education was categorized into completed 8th grade or less (0), completed 9th-11th grade (1), or completed a high school education/GED or higher (2). Annual household income was categorized into earning less than $10,000 (0), $10,000-$14,999 (1), $15,000-$24,999 (2), or $25,000 or more (3). Job-related injury was measured by the question, "Have you ever been injured on the job?" and referred to working in agriculture. Response options were dichotomous, yes (1) or no (0). Average hours of sleep per night was assessed through the following question, "How many hours a night do you normally sleep?" Responses were coded as a continuous variable. Job demands were measured using two questions assessing whether the farmworker was required to "work very hard" and if they had to do an "excessive amount of work" in their current farm working job.[33] Response options for these questions were never (0), sometimes (1), often (2), and always (3). Responses were summed, and a score of two or higher was considered high job demands. Self-rated health was measured with the standard question, "Would you say that in general your health is … excellent, very good, good, fair, or poor?" Response options were coded 4, 3, 2, 1, and 0, respectively. Responses were then dichotomized into good, very good, or excellent (0) and poor or fair (1) based on standard practice.[34] Healthcare access was measured using various dichotomous questions including whether the participant had some form of health insurance, a regular healthcare provider, and whether or not there was a time during the last 12 months that they were not able to see a healthcare provider when they needed to due to cost. All were coded yes (1) and no (0).

Analysis

SPSS version 25 was used to analyze the data. First, descriptive statistics were calculated for demographic and health-related variables of interest. Then, chi-square tests were used to assess the association between gender and pain, job-related injury, health insurance, source of regular healthcare, and inability to seek care due to cost. Non-parametric Wilcoxon Rank-Sum tests were used to assess the relationship between gender, fatigue, and hours of sleep, because the sample size was unbalanced, and the assumptions of the t-test were not met. Pearson correlations were used to assess associations between study variables, and those with a p-value of > 0.1 in bivariate analyses were not included in multivariable models. Finally, linear and generalized linear mixed effect models were used to account for any potential clustering of participants by migrant camp. All continuous variables were centered prior to developing the models. Then, a linear mixed effect model was used to assess gender as a predictor of fatigue (a continuous variable) using age, pain, sleep, job demands, and poor self-rated health as fixed effects. A generalized linear mixed model was used to assess whether gender was a predictor of pain (a binary variable) using fatigue, job-related injury, job demands, years working in agriculture, and poor self-rated health as fixed effects. Camp,

our grouping factor, was used as a random effect in both models.

Results

Of the 241 participants, 78.8% of participants were male, and 83.1% were from Mexico. The mean age of participants was 36.4 years old (SD = 13.7); however, female participants were on average older than males, 39.9 years old (SD = 13.2) compared to 35.5 years old (SD = 13.7) for males. The majority of participants worked detasseling corn and had worked at least one year previously as a migrant farmworker. Demographic characteristics of participants are presented in Table 1.

Most participants rated their health as good, very good, or excellent (74.3%); however, most lacked health insurance (71.1%) as well as a personal doctor or regular source of care (81.9%). Nearly 45% of female participants were unable to seek care due to economic concerns in the last year. About 18% of participants had experienced an occupational injury, and nearly 41% reported pain. Health-related characteristics of participants are presented in Table 2.

The results for the Wilcoxon Rank-Sum test for fatigue indicated that the mean rank for males was 114.48 while the mean rank for females was 145.27. Therefore, females reported significantly higher levels of fatigue than males, $z = -2.82$, $p = .005$.

Results from a chi-square test of independence, χ^2 (1, N = 241) = 7.04, $p = .008$, indicated that females were significantly more likely to report having pain than their male counterparts.

Fatigue was significantly positively associated with pain, job demands, and poor health and significantly negatively correlated with hours of sleep. Pain was significantly positively associated with

Table 1. Demographic characteristics of study participants.

Variable	Total (N = 241) N (%)/M (SD)	Males (N = 190) N (%)/M (SD)	Females (N = 51) N (%)/M (SD)
Age	36.4 (13.7)	35.5 (13.7)	39.9 (13.2)
Length of Time Working as Migrant Farmworker			
Less than 1 year	41 (17.1)	31 (16.4)	10 (19.6)
1–4 years	66 (27.5)	58 (30.7)	8 (15.7)
5 or more years	133 (55.4)	100 (52.9)	33 (64.7)
Crop/Job Task			
Corn – Detasseling	171 (71.0)	156 (82.1)	15 (29.4)
Corn – Seed sorting	55 (22.8)	29 (15.3)	26 (51.0)
Other vegetables	15 (6.2)	5 (2.6)	10 (19.6)
Nativity			
Mexico	196 (81.3)	164 (86.3)	32 (62.7)
United States	39 (16.2)	23 (12.1)	16 (31.4)
Other	6 (2.5)	3 (1.6)	3 (5.9)
Working with H-2A visa	107 (44.4)	104 (54.7)	3 (5.9)
Relationship Status			
Married	139 (58.9)	115 (61.5)	24 (49.0)
Member of unmarried couple	30 (12.7)	25 (13.4)	5 (10.2)
Separated or divorced	18 (7.6)	11 (5.9)	7 (14.3)
Never married	49 (20.8)	36 (19.3)	13 (26.5)
Number of People in the Household[a]	4.9 (2.1)	4.7 (1.9)	5.1 (2.7)
Number of Children in Household[b]	1.9 (1.6)	1.9 (1.6)	2.0 (1.9)
Education			
Completed less than 8 years of formal schooling	84 (34.8)	74 (38.9)	10 (19.6)
Completed between 9–11 years of formal schooling	86 (35.7)	69 (36.3)	17 (33.3)
Completed high school/GED or higher	71 (29.5)	47 (24.8)	24 (47.1)
Annual Household Income			
Less than $10,000	115 (48.7)	95 (50.8)	20 (40.8)
$10,000-$14,999	58 (24.6)	47 (25.1)	11 (22.5)
$15,000-$24,999	50 (21.2)	35 (18.7)	15 (30.6)
More than $25,000	13 (5.5)	10 (5.4)	3 (6.1)

[a]Number of people in the household refers to the total number of people in the farmworker's household, which may include people who are not traveling with the farmworker at the time of the interview.
[b]Total children under age 18 refers to the total number of children under age 18 in the farmworker's household and may include children who are not traveling with the farmworker at the time of the interview.

Table 2. Health characteristics of study participants.

	Total				Males			Females		
Variable	N (%)	M (SD)	95% CI	p	N (%)	M (SD)	95% CI	N (%)	M (SD)	95% CI
Fatigue*		13.4 (4.9)	12.8, 14.0	.005		12.8 (4.3)	12.2, 13.4		15.5 (6.1)	13.8, 17.2
Pain*	98 (40.7)			.008	69 (36.3)			29 (56.9)		
Job-related injury	44 (18.3)			.791	34 (18.0)			10 (19.6)		
Self-rated health				.498						
Excellent, very good, or good	179 (74.3)				143 (75.3)			36 (70.6)		
Fair or poor	62 (25.7)				47 (24.7)			15 (29.4)		
Hours of sleep per night		6.8 (1.2)	6.6, 7.0	.568		6.8 (1.1)	6.7, 7.0		6.7 (1.6)	6.3, 7.1
Has health insurance				.065						
Yes	55 (23.4)				48 (26.1)			7 (13.7)		
Yes, but in a different location (outside of Nebraska)	13 (5.5)				11 (6.0)			2 (3.9)		
No	167 (71.1)				125 (67.9)			42 (82.4)		
Has a regular doctor or source of care				.597						
Yes	45 (19.1)				33 (17.7)			12 (24.0)		
No	191 (81.9)				153 (82.3)			38 (76.0)		
Unable to seek care due to cost*	57 (24.1)			.000	36 (18.9)			21 (44.7)		

* Indicates significant difference between male and female participants

Table 3. Correlations among study variables.

	Fatigue	Pain	Injury	Sleep	Job Demands	Age	Years Worked in Agriculture	Hours Worked Per Week	Poor Health
Fatigue	1.00								
Pain	.29**	1.00							
Injury	.10	.20**	1.00						
Sleep	−.24**	−.10	−.21**	1.00					
Job Demands	.32**	.23**	.14*	−.31**	1.00				
Age	.01	.13	.08	−.06	.11	1.00			
Years Worked in Agriculture	.04	.15*	.03	−.17**	.21**	.63**	1.00		
Hours Worked Per Week	−.04	−.03	.14*	−.20**	.19**	.07	.07	1.00	
Poor Health	.17**	.17**	.14*	−.08	.20**	.37**	.32**	.03	1.00

* $p < .05$, ** $p < .01$.

job-related injury, job demands, years worked in agriculture, and poor health (Table 3).

Linear and generalized linear mixed effect models were estimated based on the significant bivariate findings. The first model was a linear mixed effect model used to assess gender as a predictor of fatigue while using the covariates as fixed effects. Being female, pain, hours of sleep, and job demands were significant predictors of fatigue. The second model was a generalized linear mixed model to assess gender as a predictor of pain while using covariates as fixed effects. Fatigue and job-related injury were the only significant predictors of pain. There were no significant random effects based on migrant camp in either model (Table 4).

Discussion

The purpose of this study was to explore gender-related differences in the reporting of fatigue and pain and to identify the predictors of fatigue and pain among migrant farmworkers in Nebraska. Our findings indicated that there were moderate levels of fatigue and high levels of pain among migrant farmworkers in the Midwest even though most workers rated their health as good, very good, or excellent. We found that women reported higher levels of fatigue and pain than their male counterparts; however, being female was only a significant predictor of fatigue, not pain. This juxtaposition between reporting good health, fatigue, and pain is intriguing, and it may point to cultural notions of "hard work" and its implications, as well as the embodiment of *sufrimiento* (having to suffer to survive), particularly for women.[35]

Contrary to other studies, the number of hours worked per week was not significantly associated with fatigue.[36,37] This could in part be due to the use of job demands in our model being a more

Table 4. Linear and generalized linear mixed effect models predicting fatigue and pain.

Model 1: Fatigue				Model 2: Pain			
	B	S.E.	95% CI		Exp(B)	S.E.	95% CI
Female	2.33***	0.70	0.93, 3.73	Female	1.74	0.57	0.57, 5.32
Age	−0.04	0.02	−0.08, 0.01	Fatigue	1.10***	0.02	1.05, 1.14
Pain	1.96***	0.59	0.80, 3.12	Job-Related Injury	2.30***	0.15	1.70, 3.10
Sleep	−0.57*	0.23	−1.04, −0.11	Job Demands	1.14	0.09	0.94, 1.37
Job Demands	0.43**	0.14	0.14, 0.71	Years Worked in Agriculture	1.02	0.01	0.99, 1.04
Poor Self-Rated Health	1.36	0.69	0.00, 2.73	Poor Self-Rated Health	1.43	0.32	0.77, 2.66
Constant	−1.67	0.43	−2.50, −0.75	Constant	0.51	0.32	0.27, 0.96

* $p < .05$, ** $p < .01$, *** $p < .001$.

accurate predictor than just the number of hours worked because it showed the participant was interpreting their work to be demanding and excessive. By far, most participants were engaged in the time sensitive task of corn detasseling and were employed by labor contractors. Each crew was being paid by the number of acres that they detasseled. Payment was typically divided among crew members; therefore, there was direct pressure from the crew chief and peer pressure from other workers to move quickly to complete as many acres as possible. This may partially explain why job demands were a significant predicator of fatigue and the number of hours worked per week was not.

This study was the first to explore gender-related differences in reporting fatigue and pain among migrant farmworkers in the Midwest. Consistent with a previous study, our findings indicated that female farmworkers were significantly more likely to report both fatigue and pain.[12] Perhaps, this could be due to having to do both field work and housework. Anecdotally, our research team noted that female participants were more likely to have their children present with them. Female participants were also much less likely to be working with an H-2A visa than their male counterparts. Although the H-2A program has many persistent problems, it may provide some limited protections to workers, particularly in terms of legal authorization to work and financial renumeration including the "three-fourths guarantee," which requires that agricultural employers pay workers for at least 75% of the workdays that were specified in the contract regardless of whether or not these hours were actually worked.[38] Therefore, the constant pressure to produce quickly may not be felt as strongly among the H-2A workers compared to those without.

Consistent with other studies, the number of hours of sleep per night was negatively correlated with fatigue.[39] Sleep deprivation not only makes a person feel tired, but it is also associated with occupational safety and long-term chronic health conditions such as diabetes, obesity, and cardiovascular disease.[40] Sleep is imperative to maintaining physical health and well-being. Although our study did not collect data on housing quality or the presence of air conditioning, it is clear from the literature that increasing the number of hours of sleep per night coupled with safe quality air conditioned housing for farmworkers could assist in reducing fatigue.[20,40,41]

In our study, pain was correlated with fatigue, job-related injury, job demands, years worked in agriculture, and poor health; however, only fatigue and job-related injury were significant predictors of pain, not gender. Based on our team's interactions with workers, and similar to what anthropological studies have noted, pain was understood as a normal part of farm work, and injuries were commonplace.[42,43] About one out of every five workers reported an occupational injury. Physical labor clearly takes a toll on the body, and injuries may be felt long after an acute incident. Because production must go on, oftentimes farmworkers continue to work with their injuries and pain because of their economic situation and fear of losing their job, which may lead to further fatigue, injury, or disability.[42] Furthermore, because women in the sample were on average slightly older than male participants, their pain could have also been associated with wear-and-tear to the body that occurs as regular part of aging and years of agricultural work.[25,29]

We clearly see a bidirectional relationship between fatigue and pain. Fatigue may predict pain, but pain may also predict fatigue.[44,45] Because these two issues are intertwined, efforts must be made to reduce both. Extra precautions need to be taken to promote health, safety, and well-being. Below are a number of recommendations to improve the working environment and access to healthcare for Latino/a migrant farmworkers.

Recommendations

First, employers should provide appropriate health and safety training to all workers. Because fatigue is both a safety and profitability issue, employers should discuss signs and symptoms of fatigue with their employees. This may help workers to recognize when they are feeling fatigued and identify necessary opportunities for improvements in the work environment. Second, even though workers should be provided with breaks and adequate recovery time between shifts, oftentimes, because of the nature of production agriculture, such practices are not followed. Employers should enforce current safety regulations and farm policies, [46] ensuring that managers and supervisors give workers adequate rest breaks, even if not required by law, particularly during peak production times such as planting and harvesting or during extreme heat. Employers may even consider modifying work hours, rotating jobs, or using other strategies such as air conditioning in housing units to improve both the working and living environments for these workers. Third, ergonomic solutions for common farm work tasks are necessary. For example, buckets used by apple harvesters were redesigned to use a hip belt to reduce physical fatigue.[47] These types of solutions must be gender specific. Perhaps, there are other opportunities to develop new technologies or methods for completing common Midwestern farm tasks that may ultimately reduce farmworker fatigue and pain and improve productivity. Finally, employers are encouraged to focus on fostering a protective safety climate. In such environments, farmworkers should feel safe in talking with their supervisors about safety or health concerns, reporting potential hazards, and refusing unsafe work.[48] Both explicit and tacit changes to administrative controls, work practices, and safety training programs like the ones described may improve safety climate on the farm.[49] Ultimately, improving safety climate could help agricultural employers to ensure that workers feel valued and protected as well as minimize job-related risks.

As evidenced by this study, farmworkers had little access to healthcare, and most noted they did not have a regular source of care or health insurance coverage, including the vast majority of female participants. Increasing access to healthcare is an important step in improving farmworker health. Integrating consistent screening for fatigue and pain during healthcare visits at Migrant Health Centers or other primary care clinics could be a valuable step in identifying the prevalence of these concerns and educating farmworkers about prevention and management strategies.

Limitations

This study had some limitations to note. First, data presented are cross-sectional in nature; therefore, we are unable to determine causality. Fatigue and pain are intricately linked, making it difficult to understand the temporal order of what came first. Second, the sample was not randomly selected, and some workers may have chosen not to participate in camp meetings about the study due to personal time considerations. Furthermore, study participants may not be representative of all Latino/a migrant farmworkers or farmworkers in the Midwest, particularly since there was a high concentration of those working in seed corn production and a limited sample size of female farmworkers. Third, this study used subjective measures for both fatigue and pain based on workers' reports; therefore, self-report bias and fear of reprisal may have affected reporting. Finally, the relationships observed between dependent and independent variables may reflect both real co-variation and that resulting from the implicit theories of participants about the constructs assessed.[50] Despite these limitations, this study had an adequate total sample size, and participants' responses were anonymous, thereby decreasing potential sources of bias. We also assessed mainly those working in seed corn production, which is a growing commodity worker group that is underrepresented in the migrant farmworker literature.

Conclusion

As evidenced by this study, there were gender-related differences in reporting fatigue and pain, with women reporting more fatigue and a higher likelihood of pain. Being female was a significant predictor of fatigue, but not pain. Understanding factors associated with fatigue and pain is critical to developing relevant interventions to improve health and safety among migrant farmworkers, particularly gender-specific programming. Therefore, more consistent reporting of health behaviors and health outcomes by gender is needed. Future research should explore interventions to mitigate and manage fatigue and pain in the agricultural work environment as well as to reduce the unequitable burden of these conditions that women face.

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