Stress among Latinos: Does it vary by occupation and agricultural season?

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Abstract

Objective—Stress is pervasive among Latino immigrants. We identified seasonal and occupational patterns in stress among rural Latino immigrants.

Methods—During three agricultural periods, farmworker and non-farmworker participants responded to a 24-item stress questionnaire (Snipes et al.). We measured the associations of stress with occupation, with season, and occupation within season, adjusting for demographic variables.

Results—The highest levels of stress were observed in the pre-thinning season when pruning takes place among farmworkers. Stress is significantly higher in farmworkers compared to non-farmworkers only in the non-spray season when crops are dormant. Higher income was associated with decreased stress in the pre-thinning and thinning seasons when buds and small fruit are removed from orchards.

Conclusions—Identification of strategies to reduce stress in Latino migrants is warranted. Although some sources of stress may be intractable, others may be amenable to intervention.

Keywords

Stress; farmworker; non-farmworker; agricultural season; Latino; Hispanic

Introduction

Decades of research show that chronic stressors have a major influence on well-being, health, and overall mortality. Specifically, chronic stress is associated with an increased prevalence of mental health disorders, such as depression and anxiety, cardiovascular

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disease, and immune suppression [1]. In the United States (US), stress is pervasive among both migrant and settled-out farmworkers and mental health issues disproportionately impact Latino farmworkers, who comprise 80% of the farmworker population in the US [2]; it is estimated that between 20-55% of farmworkers suffer from at least one mental health disorder at some point in their lifetime [3-9]. The chronic stressors faced by Latino immigrants in the US include living in extreme poverty, adjusting to a foreign culture, and overcoming language barriers [10-13]. For farmworkers, this stress may be compounded by low-paying, unpredictable, and often temporary employment in the agricultural sector which subjects them to long working hours and potential exposure to toxic pesticides [12]. Despite much research on the effects of stress on farmworkers' mental health, functioning, and substance use, there is a paucity of research on the stressors themselves.

Stress-related consequences of unemployment or underemployment are well-documented with un/underemployment positively associated with poor mental health [14-16]. The availability of employment in the agricultural sector often varies substantially by season and chronic seasonal un/underemployment is experienced by Latino farmworkers across the US. In eastern Washington State where fruits and vegetables are the primary crops, work for farmworkers is likewise influenced by agricultural season. For example, jobs are scarce in the dormant months of November through February and when farms are preparing for the agricultural year (March through May). On the other hand, jobs are plentiful when thinning of buds and small fruit is required (June through August), and during the harvest season between September and October when crops are picked. Because of the strong correlation between season and employment, we hypothesize that stress levels among farmworkers will also vary by season [17].

In 2007, Snipes et al. developed a culturally appropriate instrument, which demonstrated strong reliability and validity, to measure stress in populations of Mexican immigrant farmworkers [18]. The instrument, which examines stress related to work, family, and community was only administered to farmworkers in one agricultural season, that is, the season in which work was plentiful. The purpose of this study is to use the Snipes et al. stress measure to compare the stressors of Mexican farmworkers with their Mexican non-farmworker counterparts living in the same agricultural area. Given the stressors that appear to be pervasive among Mexican immigrants, we hypothesize that non-farmworkers in the same agricultural region may have similar stressors as farmworkers. We also will ascertain if the stressors among farmworkers differ by agricultural season, an area of study with little to no documented research. We hypothesize that there are behavioral and economic patterns inherent in each agricultural season that may contribute to the level of stress. Specifically, stress is hypothesized to be higher in seasons where work is scarce compared to seasons where work is plentiful.

Methods

Setting

This study was conducted in an agricultural area of eastern Washington State (the Valley) The area produces fruit and vegetable crops for national and international distribution. It is a minority-majority area, with approximately 79.4% of the population being of Hispanic

ethnicity, primarily (75%) of Mexican origin [19]. The population is generally underserved with approximately 21% of the population living below the poverty level, compared to 15.5% for the United States (US) as a whole [20]. Nearly 40% of the population speaks a language other than English at home [21]. Further, the Community Need Index (CNI) for the area which assesses socioeconomic indicators of health disparities (income, culture and language, education, housing status, and insurance coverage) for every zip code in the US, and assigns a score on a scale of 1.0 (least need) to 5.0 (most need) [22] shows that the Valley's zip codes' scores range from 4.2 to 4.8, indicating that people living in these communities are likely to suffer from many health disparities [23].

Recruitment

We followed a cohort of 100 families that had been recruited for a pesticide exposure study which aimed to ascertain the presence of various sources of pesticide residues in the home and pesticide metabolites in the urine [24]. Sixty farmworker families (one adult and one referent child) were followed for this study. In addition, 40 non-farmworker families (one adult and one referent child) were followed for comparison purposes. Project staff, consisting of trained *promotores* (lay health workers), visited the families to explain the study, provide information on samples and questionnaires required for the study, and outline incentives for participation. If the family agreed to participate, the *promotores* reviewed the informed consent, addressed questions, and had the participant sign the consent. All aspects of the study were reviewed and approved by the Institutional Review Board of the Fred Hutchinson Cancer Research Center.

Agricultural Seasons

Data collection for this study took place in three different agricultural periods from March through December of 2011. The agricultural periods were the *pre-thinning* season (March-May), when orchards are sprayed with a variety of organophosphate pesticides (OPs); the *thinning* season (June through August), when buds and small fruit are picked to allow the remaining fruit to grow larger and OPs are used to prevent pesticide damage; and the *non-spray* season (November-February), when crops are dormant and sprays are not used. The three agricultural seasons result in quite different living situations for the farmworkers. During the pre-thinning season, there are few jobs, and many farmworkers will not have worked since the harvest season (September-October); during the thinning and harvest seasons (June-October), jobs are plentiful and farmworkers typically work long hours in the fields. During the non-spray season (November-February), employment diminishes.

Procedures

During each agricultural period, both farmworker and non-farmworker participants responded to a series of questionnaires. Specific for this report, adults responded in each season to the stress questionnaire developed by Snipes et al.[18]. Thus, we were able to examine changes in stress by agricultural season and by occupational status (i.e., farmworker or non-farmworker).

Instruments

The stress instrument used in this study was developed for and validated in Mexican farmworkers [18]. The scale has been completely described elsewhere [18]. Briefly, qualitative data from a number of focus groups were used to develop this 24-item stress scale. Themes were identified and a stress scale was developed from those themes. The scale was then tested for reliability in a separate sample. The scale includes questions related to life stressors; specifically stress related to work, family, and community. The instrument has been shown to be a culturally appropriate instrument for people of Mexican origin, and was considered appropriate for our study population, which was from a rural and predominately agricultural region. It has excellent reliability (α=0.91) and strong test-retest coefficients (r=0.83, p<0.0001).

Each of the 24 stress questions were converted from the original scale of 1 (low stress) to 5 (stressed most of the time) to a scale of 0 (low stress) to 1 (stressed most of the time) to reflect the proportion of time an individual experienced each stressor. To calculate an overall stress score the 24 items were summed for each participant and scaled so the total stress was between 0 and 100.

Statistical Analysis

Descriptive statistics were reported for standard demographic characteristics of the study population and reviewed to identify potential covariates for subsequent models.

To test the hypothesis that stress level varies by season, we used a generalized estimating equations (GEE) approach where the within subject correlation is accounted for using an exchangeable working correlation matrix to calculate the estimated difference in stress between seasons. Estimates for each season were adjusted for language, health insurance status, and income. Estimates, 95% confidence intervals, and p-values were calculated for each covariate included in the model.

To test the hypothesis that stress level varies by farmworker status, we used a general linear model (GLM), stratified by season, to estimate the expected stress level among farmworkers compared to non-farmworkers. Estimates were adjusted for language, health insurance status, and income. Estimates, 95% confidence intervals, and p-values were calculated for each covariate included in the model.

Results

The composition of farmworkers and non-farmworkers was similar in terms of gender, age, and marital status (Table 1). A greater proportion of non-farmworkers than farmworkers earned greater than $25,000 a year. A majority of the farmworkers spoke only Spanish (70%) or Spanish more than English (28%) whereas the non-farmworkers were more likely to speak English and one-third reported they spoke both languages equally. More non-farmworkers (45%) had health insurance than farmworkers (10%). A similar proportion of farmworkers and non-farmworkers had lived in the area for over 9 years.

Among the 24 items comprising the stress scale, the highest stressors included not speaking English, family members living far away and not having enough money to pay bills, and more specifically, lack of money to pay medical bills (Table 2). As a whole, the participants were least stressed by drinking problems, drug use, and domestic violence in the home.

Overall stress levels varied by season and occupation (Table 4) when only these two factors were examined, with the highest levels seen in farmworkers compared to non-farmworkers and during the pre-thinning season compared to the thinning and non-spray seasons (Table 3). However, these associations decreased in magnitude and the association with farmworker status was no longer significant when controlling for language, health insurance status, and in particular income; as increased income (>$25,000 a year) was significantly associated with a decrease in stress.

In the within season analysis, non-farmworkers had decreased levels of stress compared to farmworkers only in the non-spray season (Table 5). This association remained when controlling for language, health insurance status, and income. Although this relationship between stress and occupation was not found in the pre-thinning and thinning seasons, higher income was associated with decreased stress in these two seasons.

Discussion

This study of stress among farmworkers and non-farmworkers in eastern Washington state supports evidence that stress is common among people living in the Valley, stress varies based on agricultural season, and farmworkers experience more stress than non-farmworkers. The pre-thinning season (March-May) was associated with the highest levels of stress overall; during the thinning season (June-August), farmworkers experienced more stress than non-farmworkers, although only the difference in the non-spray season was significant. Nevertheless, there was a trend to decreased levels of stress among both farmworkers and non-farmworkers over the course of the year's agricultural seasons.

The demographics of farmworkers and non-farmworkers included in this study were very similar in terms of gender, age, income, marital status, and years of residence in the Valley. Language and insurance status varied significantly by farmworker status in the study population, with over 70 percent of farmworkers speaking only Spanish and over 90 percent of farmworkers with no health insurance. The similarities in the underlying demographics of the study population may explain the small effect of occupation associated with stress. Income, however, was associated with stress, with those being in higher income brackets reporting less stress.

Farmworkers reported higher stress in all stress categories for all seasons. Similar to previous research, stress associated with family and home problems was significantly higher among farmworkers than non-farmworkers, particularly in the non-spray season [3, 4]. Language stress was significantly higher among farmworkers than non-farmworkers in all seasons, suggesting that anxiety associated with lack of acculturation may be an important area for potential intervention.

Interestingly, however, there was not a significant difference in overall stress comparing farmworkers to non-farmworkers. Knowing that farm work presents unique stressors, this may imply that farmworkers have adapted coping strategies and suggests that further studies are warranted to determine what coping strategies farmworkers have adopted. However, this may also be indicative of the high levels of stress immigrant populations face in general due to poverty, being separated from family, adjusting to a new foreign culture, language barriers, and unauthorized immigration status [10-13]. Future studies should investigate differences between non-migrant and migrant farmworkers.

This study is not without limitations. The sample of farmworkers and non-farmworkers was not a random sample of the population in the Valley and therefore, results are not necessarily generalizable to the broader population. This was also a relatively small sample of participants, though increasing the number of participants would likely only increase the strength of association between occupation status, season, and stress. Stress was measured through self-report on a questionnaire, resulting in the possibility of social desirability bias; future studies may consider using biological samples to track stress levels over time. Nevertheless, questionnaire measures of stress are more likely to assess chronic stress while biological specimens tend to capture acute stress [25]. A final limitation of this study is that both groups being compared are Latinos, although they differ by occupation status (farmworker vs. non-farmworker). The stress associated with being a minority group member may overshadow the stress associated with occupational status in these two populations. Future studies should include other populations—non-minority farmworkers and non-minority non-farmworkers.

Conclusion

This study expands the knowledge of the association between stress, season, and occupation in a rural Latino population in Washington State. In all three agricultural seasons, farmworkers reported higher levels of stress for all the stress categories. Overall stress was associated with season, and was associated with farmworker status only during the non-spray season. This study shows that both farmworkers and non-farmworkers experience high-levels of stress: work stress, community stress, family and home stress, physiological consequences of stress, and acculturation/language stress are major stressors for farmworkers and non-farmworkers, alike.

Given that chronic stress influences well-being, physical and mental health, and overall mortality, the public health impact of stress should not be overlooked. Immigrant Mexican farmworkers and non-farmworkers are a population that would benefit from the identification and implementation of targeted strategies to reduce or better manage stress. Although some sources of stress may be intractable (e.g., work stress, language stress), others may be amenable to intervention.

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Table 1

Demographic characteristics by farmworker status.

Characteristic	Total	Farmworker	Non-Farmworker	p value
	N (%)	N (%)	N (%)	
Gender				
Male	13 (13.0)	7 (11.7)	6 (15.0)	
Female	87 (87.0)	53 (88.3)	34 (85.0)	0.763
Age				
18-34	30 (30.0)	16 (26.7)	14 (35.0)	
35-50	67 (67.0)	43 (71.7)	24 (60.0)	
50+	3 (3.0)	1 (1.7)	2 (5.0)	0.327
Income				
Less than $15,000	21 (22.8)	14 (23.7)	7 (21.2)	
$15,001 to $25,000	22 (23.9)	17 (28.8)	5 (15.2)	
More than $25,000	49 (53.3)	28 (47.5)	21 (63.6)	0.085
Marital Status				
Married/living with partner	86 (86.0)	52 (86.7)	34 (85.0)	
Widowed/divorced/single	8 (8.0)	5 (8.3)	3 (7.5)	
Never married	6 (6.0)	3 (5.0)	3 (7.5)	0.908
Language				
Only Spanish	53 (53.0)	42 (70.0)	11 (27.5)	
Other	47 (47.0)	18 (30.0)	29 (72.5)	<0.001
Insurance				
Yes	24 (24.0)	6 (10.0)	18 (45.0)	
No	76 (76.0)	54 (90.0)	22 (55.0)	0.001
Years Residence in Valley				
9	9 (9.0)	7 (11.7)	2 (5.0)	
>9	91 (91.0)	53 (88.3)	38 (95.0)	0.309

Table 2

Mean and standard deviation of stress questionnaire items by season and farmworker status[1].

Item	Pre-Thinning		Thinning		No-Spray	
	FW[2] M (SD)[3]	NFW[2] M (SD)	FW M (SD)	NFW M (SD)	FW M (SD)	NFW M (SD)
In the past month, have you felt stressed because of:						
Lack of enough work?	0.28(0.30)	0.22(0.34)	0.20(0.30)	0.14(0.26)	0.16(0.23)	0.16(0.24)
You did not have enough money to pay your bills?	0.46(0.34)	0.37(0.35)	0.30(0.31)	0.29(0.30)	0.32(0.31)	0.22(0.25)
Injustice at work?	0.11(0.22)	0.17(0.26)	0.15(0.28)	0.05(0.19)	0.18(0.27)	0.09(0.17)
Painful injuries at work?	0.10(0.23)	0.05(0.14)	0.08(0.19)	0.04(0.12)	0.06(0.17)	0.10(0.23)
Having to work too hard?	0.21(0.31)	0.11(0.19)	0.16(0.26)	0.06(0.19)	0.16(0.25)	0.14(0.24)
Where to leave your children while working?	0.15(0.27)	0.11(0.25)	0.12(0.24)	0.06(0.16)	0.13(0.24)	0.04(0.13)
Problems with your children?	0.14(0.25)	0.11(0.23)	0.12(0.23)	0.09(0.16)	0.13(0.22)	0.10(0.19)
Lack of communication in your household?	0.15(0.24)	0.11(0.21)	0.11(0.19)	0.09(0.22)	0.13(0.20)	0.06(0.13)
A drinking problem in your household?	0.06(0.19)	0.04(014)	0.03(0.15)	0.04(0.12)	0.04(0.12)	0.02(0.09)
Drug use in your home?	0.01(0.07)	0.02(0.09)	0.02(0.13)	0.01(0.08)	0.00(0.03)	0.00(0.00)
Domestic violence in your home?	0.00(0.00)	0.01(0.08)	0.01(0.06)	0.00(0.00)	0.00(0.03)	0.00(0.00)
Gang-related violence in your community?	0.23(0.32)	0.27(0.31)	0.21(0.26)	0.28(0.30)	0.22(0.25)	0.13(0.19)
Crime in your community?	0.22(0.30)	0.24(0.28)	0.17(0.24)	0.20(0.28)	0.20(0.24)	0.11(0.18)
Discrimination in your community?	0.15(0.26)	0.11(0.23)	0.10(0.20)	0.12(0.26)	0.15(0.23)	0.11(0.20)
You do not speak English?	0.39(0.35)	0.18(0.27)	0.29(0.30)	0.12(0.20)	0.32(0.28)	0.12(0.20)
Lack of communication with youth in your community?	0.18(0.26)	0.08(0.20)	0.14(0.21)	0.11(0.24)	0.19(0.25)	0.09(0.19)
Discrimination in the schools?	0.15(0.21)	0.14(0.26)	0.15(0.24)	0.11(0.24)	0.11(0.19)	0.08(0.17)
In the past month, have you had feelings of desperation because of:						
Sickness in your family?	0.18(0.27)	0.19(0.32)	0.16(0.28)	0.12(0.24)	0.14(0.24)	0.12(0.21)
Lack of money to pay medical bills?	0.32(0.33)	0.25(0.32)	0.18(0.26)	0.14(0.24)	0.19(0.25)	0.14(0.25)
Members of family have problems you cannot solve?	0.22(0.30)	0.21(0.26)	0.20(0.31)	0.15(0.26)	0.23(0.29)	0.14(0.22)
Members of your family live so far away?	0.38(0.34)	0.18(0.28)	0.32(0.31)	0.11(0.21)	0.28(0.26)	0.19(0.28)
In the past month, have you:						
Found it hard to work up the energy to do things?	0.18(0.25)	0.12(0.23)	0.16(0.25)	0.11(0.23)	0.13(0.21)	0.06(0.16)
Lost sleep because of stress?	0.28(0.32)	0.27(0.32)	0.18(0.28)	0.18(0.29)	0.17(0.27)	0.15(0.26)

Item	Pre-Thinning		Thinning		No-Spray	
	FW[2] M (SD)[3]	NFW[2] M (SD)	FW M (SD)	NFW M (SD)	FW M (SD)	NFW M (SD)
Felt depressed because of stress?	0.22(0.29)	0.21(0.29)	0.16(0.25)	0.12(0.24)	0.13(0.24)	0.10(0.21)

[1] Each question was measured from 1 to 5 where 1 is "no stress" and 5 is "stressed most of the time." We scaled each variable so the mean is between 0 and 1.

[2] FW=farmworker, NFW=non-farmworker

[3] M (SD) = mean and (standard deviation)

Table 3

Total stress[*] by season and occupation

Season	Farmworker Mean (SD)	Non-farmworker Mean (SD)
Pre-thinning	19.86 (14.47)	15.7 (13.22)
Thinning	15.47 (13.97)	11.49 (11.13)
Non Spray	15.75 (12.65)	10.29 (9.03)

[*] Stress values were summed and scaled so that stress varies between 0 and 100.

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Table 4

Stress adjusting for season[*]

	Crude (N = 289)				Adjusted (N = 289)			
	Estimate	95% LB	95% UB	p value	Estimate	95% LB	95% UB	p value
(Intercept)	19.86	16.38	23.34	<0.001	23.02	11.44	34.61	<0.001
Season								
Pre-thinning	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Thinning	−4.27	−6.49	−2.06	<0.001	−4.03	−6.29	−1.76	<0.001
Non-spray	−4.66	−7.24	−2.08	<0.001	−4.59	−7.15	−2.04	<0.001
Occupation (NFW vs. FW (ref))	−4.39	−8.40	−0.38	0.032	−3.52	−8.15	1.12	0.137
Language (ref = Spanish)					0.23	−4.84	4.38	0.923
Insurance (ref = Yes)					0.68	−3.22	4.58	0.733
Income								
<$15,000					Ref	Ref	Ref	Ref
$15,000 - $25,000					−3.94	−8.68	0.80	0.103
>$25,000					−6.19	−11.09	−1.30	0.013

[*] GEE model parameter estimates and associated confidence intervals. The p value tests the null hypothesis that stress does not change by season or occupation.

Table 5

Stress by season

	Crude			Adjusted		
	Coef.	95% CI	p value	Coef.	95% CI	p value
Pre-thinning season						
(Intercept)	19.81	(16.2, 23.4)	<0.001	28.8	(9, 48)	0.004
Occupation (ref = Farmworker)	−4.08	(−9.79, 1.6)	0.162	−3.57	(−10, 3)	0.291
Language (ref = Spanish)				−1.01	(−7, 5)	0.745
Insurance (ref = Yes)				−0.43	(−8, 7)	0.909
Income (ref = <$15,000)						
$15,000 - $25,000				−9.95	(19, −1)	0.024
>$25,000				−8.39	(−16, −1)	0.025
Thinning season						
(Intercept)	15.62	(12.32, 18.93)	<0.001	24.11	(6, 42)	0.009
Occupation (ref = Farmworker)	−4.08	(−9.43, 1.27)	0.135	−4.62	(−11, 1)	0.125
Language (ref = Spanish)				0.60	(−5, 6)	0.836
Insurance (ref = Yes)				−0.66	(−7, 6)	0.846
Income (ref = <$15,000)						
$15,000 - $25,000				−11.2	(−20, −3)	0.008
>$25,000				−9.57	(−17, −3)	0.008
Non-spray season						
(Intercept)	16.21	(13.19, 19.23)	<0.001	20.64	(5, 36)	0.010
Occupation (ref = Farmworker)	−5.98	(−10.67, −1.30)	0.012	−5.54	(−11, −0.1)	0.045
Language (ref = Spanish)				−0.21	(−5, 5)	0.938
Insurance (ref = Yes)				−0.67	(−7, 5)	0.829
Income (ref = <$15,000)						
$15,000 - $25,000				−2.06	(−9, 5)	0.579
>$25,000				−4.61	(−11, 2)	0.173