

## Mental Health Among Latina Farmworkers and Other Employed Latinas in North Carolina

Thomas A. Arcury, Joanne C. Sandberg, Jennifer W. Talton, Paul J. Laurienti, Stephanie S. Daniel, and Sara A. Quandt  
Wake Forest School of Medicine

The mental health of Latinas with manual occupations, particularly those employed in agriculture, is a public health concern. The goals of this analysis were to describe the mental health of Latina farmworkers, and to compare their mental health with that of other Latina manual workers. Participants included 35 employed Latina farmworkers, 35 employed nonfarmworkers, and 25 unemployed nonfarmworkers who completed interviews in 2012. Measures included stress, anxiety, depressive symptoms, elevated depressive symptoms, and risk for alcohol dependence. Farmworkers had greater stress and anxiety than did employed and unemployed nonfarmworkers. Employed Latinas, whether farmworkers or in other occupations, had greater stress and anxiety than unemployed Latinas. Depressive symptoms, although high, did not differ significantly by occupation and employment. Few were at risk for alcohol dependence. Concrete steps are needed to address the mental health of Latina farmworkers, and to continue documentation of mental health concerns and their causes in this population.

*Keywords:* occupational health, immigrant health, women's health, minority health, health disparities

Migrant and seasonal farmworkers are a vulnerable population who experience significant health disparities. Agriculture is an extremely hazardous industry, with exposures to chemicals, machinery, animals, and extreme weather being common. As a result, farmworkers experience

high rates of injury and illness (May, 2009). Farm work is a contingent job, with a nonstandard and seasonal work schedule. Most farmworkers are Latino, about half are undocumented, most have little formal education, most do not speak English, and most have limited access to health care (Arcury & Quandt, 2007). About 30% of farmworkers are women (Hernandez, Gabbard, & Carroll, 2016).

Farmworkers experience significant mental health concerns and problems, including stress, anxiety, and depression (Arcury et al., 2012; Chaney & Torres, 2017; Georges et al., 2013; Grzywacz, Quandt, et al., 2010; Ramos, Su, Lander, & Rivera, 2015; Winkelman, Chaney, & Bethel, 2013), as well as high levels of alcohol abuse (Arcury et al., 2016; García, 2008; Sánchez, 2015). Most farmworker mental health research has focused on men, with a few investigators comparing the mental health of male and female farmworkers. Alderete and colleagues (2000) found in a large sample of California farmworkers that women had a lower lifetime rate of any psychiatric disorder and much lower rates of alcohol and substance

---

This article was published Online First May 21, 2018.

Thomas A. Arcury and Joanne C. Sandberg, Department of Family and Community Medicine and Center for Worker Health, Wake Forest School of Medicine; Jennifer W. Talton, Department of Biostatistical Sciences, Division of Public Health Sciences, Wake Forest School of Medicine; Paul J. Laurienti, Department of Radiology, Wake Forest School of Medicine; Stephanie S. Daniel, Department of Family and Community Medicine, Wake Forest School of Medicine; Sara A. Quandt, Department of Epidemiology and Prevention, Division of Public Health Sciences and Center for Worker Health, Wake Forest School of Medicine.

This article is based on work supported by grants from the National Institute of Environmental Health Sciences (Grants R01-ES008739 and R21-ES019720).

Correspondence concerning this article should be addressed to Thomas A. Arcury, Department of Family and Community Medicine, Wake Forest School of Medicine, Medical Center Boulevard, Winston-Salem, NC 27157-1084. E-mail: [tarcury@wakehealth.edu](mailto:tarcury@wakehealth.edu)

abuse than men; women and men had similar rates of mood and anxiety disorders. Hovey and Magaña (2002) found no gender differences in anxiety among Midwest farmworkers, with Magaña and Hovey (2003) reporting that more women than men reached caseness for anxiety (39% vs. 22%), but were similar in reaching caseness for depression. More recently, Chaney and Torres (2017) found no gender differences in stress or depressive symptoms among farmworkers in North Carolina (NC). Grzywacz, Alterman, et al. (2010) evaluated instruments that measure Latino farmworker stress; this evaluation compared these stress measures for male and female farmworkers.

Some recent research has focused on the general health of Latina farmworkers. For example, Flocks, Runkle, and colleagues addressed the health of women working on Florida farms and nurseries, documenting their exposure to pesticides (Flocks, Kelley, Economos, & McCauley, 2012; Runkle et al., 2013), and their health during pregnancy (Flocks et al., 2013; Runkle, Flocks, Economos, Tovar-Aguilar, & McCauley, 2014). Knoff, Harlow, Yassine, and Soliman (2013) and Castañeda, Rosenbaum, Gonzalez, and Holscher (2012) documented breast and cervical cancer screening, and Luque, Castañeda, Tyson, Vargas, and Meade (2012) discussed HPV vaccine acceptability among Latina farmworkers.

Investigators have begun to address the mental health of women who are farmworkers or who are the members of farmworker families (Arcury, Trejo, et al., 2015; Pulgar et al., 2016; Zapata Roblyer et al., 2016). Women in farmworker families, a third of whom were employed as farmworkers, a third of whom were employed in other manual occupations, and a third of whom were unemployed, experienced high levels of stress and depressive symptoms (Arcury, Trejo, et al., 2015; Pulgar et al., 2016). For example, 31.3% of these women, compared with 9.3% of the United States female population, experienced significant depressive symptoms (Pulgar et al., 2016). Stress was greater among those employed as farmworkers than among those employed as operatives, but farmworkers did not differ in stress compared with domestic workers or those with other occupations (Arcury, Trejo, et al., 2015). Depressive symptoms did not differ by occupation.

Hsieh, Apostolopoulos, Hatzudis, and Sönmez (2016) provided a review of mental health research among working class Latinas, highlighting both their mental health challenges and the limited research examining their mental health. Recent analyses have examined the mental health of Latina workers employed in nonagricultural manual occupations. Using data from Latino manual workers in western NC, Hiott, Grzywacz, Arcury, and Quandt (2006) found that men and women did not differ in levels of anxiety and depression, with almost 40% of all participants experiencing levels of anxiety and depression that could impair functioning. Latino women and men did differ in the factors associated with anxiety and depression; feeling separated from family was more important for women, with feelings of social marginalization being more important for men. Examining Latina manual workers in western NC, Arcury, Grzywacz, Chen, Mora, and Quandt (2014) found that depressive symptoms were associated with greater job demands (heavy load, awkward posture, greater psychological demand), less decision latitude, and less supervisor support. Rodriguez et al. (2016) documented that employed Latinas perceived their work environments to be contingent and unsupportive. Tied to demanding domestic roles, these work environments resulted in work-family conflicts that negatively affected their mental health, and had negative effects on the care and health of their families.

The mental health of Latinas working in manual occupations, particularly those employed in agriculture, is an important public health concern. However, research documenting the mental health of these women is limited. The goals of this analysis are to describe mental health among Latina farmworkers working in NC, and to compare their mental health with that of other Latina manual workers in the state.

## Method

This analysis uses data collected through a community-based participatory research collaboration that includes organizing organizations serving Latino immigrants and investigators at Wake Forest School of Medicine which began in 1995. The NC Farmworkers Project serves the immigrant farmworker community of eastern NC, and El Buen Pastor Latino Community Services

serves the immigrant Latino community in Winston-Salem, NC. The study protocol was approved by the Wake Forest School of Medicine Institutional Review Board. All participants gave signed informed consent.

### Population and Sample

Participants were recruited from two areas of NC. Latina farmworkers were recruited in Harnett, Johnston, and Sampson Counties, which are located in eastern NC. Latina immigrants not employed in agriculture were recruited in Winston-Salem/Forsyth County, which is located in west central NC. The two areas in which participants were recruited are similar in that both have large Latino populations that expanded after 1990. In 2016, 12.7% of the Forsyth County population was Latino, with 12.4% of the Harnett County population, 13.1% of the Johnston County population, and 19.9% of the Sampson County population being Latino. As “new settlement communities,” each has struggled to provide services and resources to their new ethnic minority population. The two areas also differ. Winston-Salem/Forsyth County is part of a metropolitan region with a diverse economy, but limited agriculture. Two major medical centers and three major universities are located in Forsyth County. Harnett, Johnston, and Sampson Counties are rural counties that border the Raleigh, NC, metropolitan region. Agriculture is a major component of the county economies. Being rural, their residents have limited access to health care.

Participants for this analysis included women aged 18 through 55 years who self-identified as Latino or Hispanic, and who spoke Spanish or English fluently. Latina farmworkers had to be currently employed in agriculture and have worked in agriculture for at least three years. Latinas not employed in agriculture could not have been employed for the past three years in jobs that expose workers to pesticides, including agriculture, forestry, landscaping, grounds keeping, lawn maintenance, and pest control. Potential participants were excluded if they reported being told by a health care professional that they had diabetes. The requirements that nonfarmworker participants not have work that would result in pesticide exposure, and all participants not have diabetes were dictated by the larger project for which the participants were

recruited. The aims of this larger study were focused on the effects of pesticide exposure on subclinical neurological health, including peripheral neuropathy (Quandt et al., 2016). Diabetes can cause peripheral neuropathy.

Recruitment was accomplished with the assistance of community partners, who contacted potential participants and referred individuals to the study who met the inclusion criteria. A total of 95 women, 35 farmworkers and 60 nonfarmworkers, met the inclusion criteria and participated in data collection. Because community partners made the initial contacts with potential participants, the number who did not agree to participate is not known.

### Data Collection

Data for this analysis were collected with an interviewer-administered questionnaire conducted in May through November 2012. Previous research with NC farmworkers found variation in levels of depressive symptoms across the agricultural season (Grzywacz, Quandt, et al., 2010). The participants in this earlier study were overwhelmingly male migrant farmworkers with H-2A visas who migrated from Mexico to NC each year. They experienced increased levels of depressive symptoms soon after they arrived in NC, and soon before returning to Mexico. The participants in the current study were women seasonal farmworkers who reside in NC year-round, but who are employed in farm work during the agricultural season. Therefore, seasonality of depressive symptoms was not considered in this study.

The questionnaire included the validated Spanish versions of scales measuring several dimensions of mental health. Other questionnaire items were developed in English and translated into Spanish. The Spanish and English versions of these other items were checked for comparable meaning, and item wording was adjusted as needed. The questionnaire was pre-tested with several native Spanish speakers before final corrections were made. Study data were collected and managed using Research Electronic Data Capture (REDCap), a secure, web-based application designed to support data capture for research studies and hosted by Wake Forest School of Medicine (Harris et al., 2009). Interviewers included native Spanish speakers who completed training that addressed ques-

tionnaire content and proper technique for conducting interviews. Interviews were conducted in participants' homes or in a neutral site, such as a church.

## Measures

Stress was measured with a 17-item instrument that assesses exposure to stressors inherent among migrant adults (Magaña & Hovey, 2003). Items tap perceived discrimination (e.g., "I have experienced discrimination in this country"), acculturative stress (e.g., "I worry about my relationship with my partner"), and poor working conditions and physically demanding work (e.g., "There is not enough water to drink when I am working"). Respondents rate each item that they have experienced on a 5-point scale, 0 (*have not experienced*) to 4 (*extremely stressful*). Scores are obtained by summing the response for the 17 items for a possible range of 0 to 68. Higher scores reflect a higher level of stress. The mean score in this analysis was 21.0, with a standard deviation of 9.9. Cronbach's alpha was 0.78.

Anxiety was measured using 24 items selected from the Personality Assessment Inventory (Morey, 1991; Rogers, Flores, Ustad, & Sewell, 1995). These items have been used to measure anxiety in Latino farmworkers and other Latino workers in a number of studies (e.g., Grzywacz, Quandt, et al., 2006). These items address cognitive (e.g., "I often have trouble concentrating because I am nervous"), affective (e.g., "I'm often so worried and nervous that I can barely stand it"), and physical (e.g., "Sometimes I feel dizzy when I've been under a lot of pressure") aspects of anxiety. Participants rated items on a 4-point scale, 0 (*not at all true*) to 3 (*very true*), with items being reverse coded so that higher scores reflect more anxiety symptoms. Raw values were transformed into *T* scores to provide interpretation relative to a standard sample of community-dwelling adults. The mean for the raw score was 23.8, with a standard deviation of 9.9; the mean for the *T* score was 56.9, with a standard deviation of 9.3 for the *T* score. Cronbach's alpha was 0.83.

Depressive symptoms were measured with a validated Spanish version of the Center for Epidemiologic Studies Depression Scale Short Form (CES-D-10; Grzywacz, Hovey, Seligman, Arcury, & Quandt, 2006; Kohout, Berkman,

Evans, & Cornoni-Huntley, 1993). Participants ranked 10 experiences (e.g., "I felt that everything I did was an effort," "People were unfriendly," "I felt sad") in the past week on a 4-point scale of 0 (*rarely or none of the time*) to 3 (*most or all of the time*). The mean score was 5.5, with a standard deviation of 5.4. Cronbach's alpha was 0.82. Participants were placed into two categories of elevated depressive symptoms based on their CES-D scores: those with a score of 10 or higher were considered to have elevated depressive symptoms, and those with a score lower than 10 did not have elevated depressive symptoms. A score of 10 or higher is generally used as an indicator of elevated depressive symptoms (Andresen, Malmgren, Carter, & Patrick, 1994).

The Spanish version (4M) of the CAGE questionnaire was used to screen for alcohol abuse and dependence (Cherpitel, 1999; Saitz, Lepore, Sullivan, Amaro, & Samet, 1999). It consists of four questions about perceptions of drinking behavior. (a) Have you ever had the impression that you should drink less? (b) Have you ever been bothered by people's criticism about your drinking habits? (c) Have you ever felt bad or guilty for your drinking habits? (d) Have you ever had a drink first thing in the morning to steady your nerves or to get rid of a hangover? Positive responses were coded 1. Scores range from 0 to 4, with higher scores indicating greater likelihood of problem drinking. A cutoff of 2 or more is generally used to indicate risk for alcohol dependence (Arcury et al., 2016; Mayfield, McLeod, & Hall, 1974); however, Bradley, Boyd-Wickizer, Powell, and Burman (1998) recommended that a cutoff for women should be 1 or more. Both cutoffs are reported. Participants who reported ever consuming alcohol completed the CAGE items. Those who reported never having consumed alcohol were given a score of 0 for the CAGE.

Participants were placed in three employment groups: (a) farmworker—currently employed as a farmworker; (b) employed nonfarmworker—currently employed outside the home, but not in farm work; and (c) unemployed nonfarmworker—not currently employed outside the home. The occupation of all farmworkers was farm work. All employed and unemployed nonfarmworkers lived in Winston-Salem/Forsyth County, NC. Among employed nonfarmworkers, occupations included production,

service work, sales, and other. Hours worked per week included the categories fewer than 32 hr, 32 to 40 hr, and more than 40 hr. Those working fewer than 32 hr per week were classified as part-time, and those working 32 hr per week or more were classified as full-time.

Personal characteristics included age in the categories of less than 30 years, 30 to 34 years, 35 to 44 years, and 45 years and older; education in the categories 0 to 6 years, 7 to 11 years, and 12 or more years; years lived in current house in the categories of 1 year or less, 2 to 4 years, and 5 or more years. Place of birth had the categories of Mexico, United States and Puerto Rico, Central America, and other. Preferred language had the values of Spanish, English, and other.

## Analysis

Personal characteristics and mental health indicators were evaluated descriptively (mean, standard deviation, count, percent) for the three groups of interest (farmworkers, employed nonfarmworkers, unemployed nonfarmworkers) and associations were analyzed using chi-square, Fisher's exact test, or analysis of variance as appropriate. Similarly, the chi-square test was used for the comparison between farmworkers and employed nonfarmworkers for the number of hours worked per week and employment status. Least square means and standard errors from three separate generalized linear models adjusting for age group, education, and employment status were used to examine the relationship between farmworker status (farmworker vs. employed nonfarmworker) and stress, anxiety *t* score, and depressive symptoms. Likewise, the associations between farmworker status (farmworker vs. nonfarmworker, regardless of employment status) and stress, anxiety *t* score, and depressive symptoms each were examined adjusting for age group, education, and years in current residence. Finally, the relationships between employment status (regardless of farmworker status) and stress, anxiety *t* score, and depressive symptoms were evaluated adjusting for age group, education, and years in current residence. All analyses were performed using SAS 9.4 (SAS Institute, 2014) and *p* values of less than 0.05 were considered statistically significant.

## Results

### Participant Characteristics

Participants included 35 farmworkers, 35 employed nonfarmworkers, and 25 unemployed nonfarmworkers (Table 1). These groups differed significantly by age, with 40% of farmworkers, 20% of employed nonfarmworkers, and 44% of unemployed nonfarmworkers being less than 30 years of age. Farmworkers had less education than either nonfarmworker group. Most farmworkers (57.1%) had 6 or fewer years of education, and 14.3% had 12 or more years of education. Although 42.9% of employed nonfarmworkers had 6 or fewer years of education, 31.4% had 12 or more years. About a quarter of the unemployed nonfarmworkers had 6 or fewer years, with 52% having 7 to 11 years, and 24% have 12 or more years. Farmworkers and nonfarmworkers had similar levels of residential stability, 20.0% of farmworkers, 28.6% of employed nonfarmworkers, and 28.0% of unemployed nonfarmworkers had lived in their current house for 1 year or less, but 45.7% of farmworkers, 31.4% of employed nonfarmworkers, and 40.0% of unemployed nonfarmworkers had lived in their current house for 5 or more years. Most farmworkers and nonfarmworkers were born in Mexico, and Spanish was their preferred language.

Occupations for all farmworkers was farm work, and none of the unemployed had occupations. The occupation for a plurality (48.6%) of employed nonfarmworkers was production, with 31.4% being service workers, 8.6% in sales, and 11.4% in other. Most farmworkers (51.4%) and employed nonfarmworkers (62.9%) were employed 32 to 40 hr per week (Table 2). More farmworkers (37.1%) than employed nonfarmworkers (2.9%) worked more than 40 hr per week.

### Mental Health

The mean stress score of farmworkers was 27.7, which was significantly greater than the scores for employed (17.2) and unemployed (16.9) nonfarmworkers (Table 3). Similarly, the mean anxiety score of farmworkers was 61.9, which was significantly greater than the scores for employed (54.9) and unemployed (52.9) nonfarmworkers. Depressive symptoms did not

Table 1  
*Personal Characteristics of Latina Farmworker and Nonfarmworker Participants, North Carolina, 2012*

Personal characteristic	Nonfarmworkers (n = 60)						p value <sup>a</sup>
	Farmworkers (n = 35)		Employed (n = 35)		Unemployed (n = 25)		
	n	%	n	%	n	%	
Age (years)							.0335
<30	14	40.0	7	20.0	11	44.0	
30–34	8	22.9	4	11.4	5	20.0	
35–44	7	20.0	20	57.1	8	32.0	
45+	6	17.1	4	11.4	1	4.0	
Education (years)							.0552
0–6	20	57.1	15	42.9	6	24.0	
7–11	10	28.6	9	25.7	13	52.0	
12+	5	14.3	11	31.4	6	24.0	
Years lived in current house							.7666
<1	7	20.0	10	28.6	7	28.0	
2–4	12	34.3	14	40.0	8	32.0	
5+	16	45.7	11	31.4	10	40.0	
Place of birth							.5057
Mexico	31	88.6	26	74.3	18	72.0	
United States/Puerto Rico	1	2.9	2	5.7	2	8.0	
Central America	3	8.6	6	17.1	3	12.0	
Other	0	.0	1	2.9	2	8.0	
Preferred language							.2641
Spanish	33	97.1	32	91.4	23	92.0	
English	0	.0	3	8.6	2	8.0	
Other	1	2.9	0	.0	0	.0	
Industry of current job							NA
Farmworker	35	100.0	0		0		
Production	0		17	48.6	0		
Service work (food preparation, domestic worker, personal care)	0		11	31.4	0		
Sales	0		3	8.6	0		
Other	0		4	11.4	0		
Unemployed	0		0	.0	25	100.0	

<sup>a</sup> Chi-square or Fisher's exact test as appropriate.

differ significantly among the women; farmworkers had a mean score of 6.1, employed nonfarmworkers had a mean score of 5.8, and unemployed nonfarmworkers had a mean score of 4.1. The percent of women with elevated depressive symptoms (a score of 10 or higher) was 28.6% among the farmworkers, 17.1% among the employed nonfarmworkers, and 8.0% among the unemployed nonfarmworkers. Few of the women were at risk for alcohol dependence: 8.6% of the farmworkers, 8.6% of the employed nonfarmworkers, and 12.0% of the unemployed nonfarmworkers reached the cutoff of 1 on the CAGE; 5.7% of the farmworkers, 5.7% of the employed nonfarmwork-

ers, and 4.0% of the unemployed nonfarmworkers reached the cutoff of 2 on the CAGE.

### Variation in Mental Health

**Farmworkers compared with employed nonfarmworkers.** Stress and anxiety scores remained greater for farmworkers compared with employed nonfarmworkers in multivariate models (Table 4). The least squares (LS) mean stress score for Latina farmworkers was 27.2 ( $SE = 1.8$ ); that for employed nonfarmworkers was 16.3 ( $SE = 1.7$ ,  $p < .0001$ ). The LS mean anxiety score for Latina farmworkers was 62.4 ( $SE = 1.8$ ); that for employed nonfarmworkers

Table 2  
Hours Worked per Week and Employment Status of Latina Farmworker and Employed Nonfarmworker Participants, North Carolina, 2012

Hours worked per week and employment status	Farmworkers (n = 35)		Employed nonfarmworkers (n = 35)		p value <sup>a</sup>
	n	%	n	%	
Hours worked per week					.0006
<32	4	11.4	12	34.3	
32-40	18	51.4	22	62.9	
>40	13	37.1	1	2.9	
Employment status					.0228
Part-time (<32 hr)	4	11.4	12	34.3	
Full-time (≥32 hr)	31	88.6	23	65.7	

<sup>a</sup> Chi-square test.

was 55.5 (*SE* = 1.6, *p* = .0031). Age, education and employment status were not associated with anxiety. Depressive symptoms were not associated with farmworker status among those who were employed.

**Farmworkers compared with all nonfarmworkers.** The LS mean stress score for Latina farmworkers was 25.7 (*SE* = 1.5); that for all nonfarmworkers was 14.6 (*SE* = 1.2, *p* < .0001; Table 5). Age was significantly associated with stress (*p* = .0026), with those aged 45 years and older having an LS mean stress score of 13.4 (*SE* = 2.5), and those younger than 45 having an LS mean stress score between 20 and 25. Years in current residence

was not associated with stress score. The LS mean anxiety score for Latina farmworkers was 61.7 (*SE* = 1.6); that for all nonfarmworkers was 54.4 (*SE* = 1.3, *p* = .0004). Age, education, and years in current house were not associated with anxiety. Depressive symptoms were not associated with farmworker status.

**All employed compared with all unemployed.** The LS mean stress score for employed Latinas was 20.2 (*SE* = 1.3), with that for unemployed Latinas being 14.6 (*SE* = 2.0, *p* < .0143). Age was significantly associated with stress (*p* = .0343), with those aged 45 years and older having an LS mean stress score of 11.1 (*SE* = 3.0), and those younger than 45

Table 3  
Mental Health of Latina Farmworker and Nonfarmworker Participants, North Carolina, 2012

Mental health	Farmworkers (n = 35)		Nonfarmworkers (n = 60)				p value <sup>a</sup>
	<i>M</i>	<i>SD</i>	Employed (n = 35)		Unemployed (n = 25)		
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Stress	27.7	6.2	17.2	10.9	16.9	7.7	<.0001
Anxiety	29.0	9.5	21.6	7.8	19.5	10.1	.0002
Anxiety <i>T</i> score	61.9	9.0	54.9	7.3	52.9	9.5	.0002
Depressive symptoms	6.1	4.8	5.8	6.6	4.1	4.2	.3293
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	
Elevated depressive symptoms							.1264
No (score less than 10)	25	71.4	29	82.9	23	92.0	
Yes (score of 10 or higher)	10	28.6	6	17.1	2	8.0	
Risk for alcohol dependence 1 (GAGE >1)	3	8.6	3	8.6	3	12.0	.8250
Risk for alcohol dependence 2 (GAGE >2)	2	5.7	2	5.7	1	4.0	1.0000

<sup>a</sup> Analysis of variance or chi-square test as appropriate.

**Table 4**  
*Stress, Anxiety, and Depressive Symptoms Multivariable Models for Latina Farmworkers and Employed Nonfarmworkers, North Carolina, 2012*

Personal characteristics	Stress			Anxiety <i>t</i> score			Depressive symptoms		
	LS mean	SE	<i>p</i> value	LS mean	SE	<i>p</i> value	LS mean	SE	<i>p</i> value
Farmworker status			<.0001			.0031			.6074
Farmworker	27.2	1.8		62.4	1.8		6.7	1.3	
Employed nonfarmworker	16.3	1.7		55.5	1.6		5.9	1.2	
Age (years)			.0911			.4230			.5480
<30	23.1	2.0		56.5	1.9		4.9	1.4	
30–34	23.9	2.6		59.6	2.6		5.6	1.8	
35–44	23.8	1.8		58.1	1.8		6.8	1.3	
45+	16.2	2.8		61.5	2.8		7.9	2.0	
Education (years)			.0835			.3341			.5459
0–6	24.6	1.7		60.9	1.7		6.7	1.2	
7–11	22.1	2.1		58.7	2.1		7.1	1.5	
12+	18.5	2.3		57.2	2.3		5.0	1.6	
Full- vs. part-time work status			.2220			.4305			.4179
Part-time (<32 hr/week)	23.3	2.3		59.9	2.2		7.0	1.6	
Full-time (≥32 hr/week)	20.2	1.3		58.0	1.2		5.6	.9	

*Note.*  $n = 70$ . LS = least squares; SE = standard error.

having an LS mean stress score between 18 and 21. Education was significantly associated ( $p = .0130$ ), with those having 12 or more years of education having an LS mean stress score of 13.7 ( $SE = 2.1$ ) and those having less than 12 years of education having an LS mean stress score between 17 and 21. Years in current residence was not associated with stress score. The LS mean anxiety score for employed Latinas was 58.3 ( $SE = 1.2$ ); that for unemployed Latinas was 53.6 ( $SE = 2.0$ ,  $p = .0370$ ). Age, education, and years in current house were not associated with anxiety. Depressive symptoms were not associated with employment status.

## Discussion

In the current study, Latina farmworkers have higher average stress and anxiety scores than do employed and unemployed Latina nonfarmworkers. Employed Latinas, whether farmworkers or working in other manual occupations, have higher average stress and anxiety scores than do unemployed Latinas. Stress among the Latina farmworkers and employed nonfarmworkers is similar to that reported for women in farmworker families, one third of whom were not employed (Arcury, Trejo, et al., 2015). Stress among these employed women is considerably greater than that reported among male

Latino farmworkers with H2-A visas (Arcury, Summers, et al., 2015). Anxiety among the Latina farmworkers, employed nonfarmworkers, and unemployed nonfarmworkers is similar to that reported among Latina and Latino farmworkers in the Midwest (Magaña & Hovey, 2003), and Latinas and Latinos living in Western NC (Hiott et al., 2006).

The three groups of women did not differ significantly in their depressive symptoms, which are similar to the depressive symptoms reported for women in farmworkers families (Arcury, Trejo, et al., 2015), and among Latina manual workers (Arcury et al., 2014). Although based on the 20-item CES-D, rather than the 10-item CES-D used in this analysis, the depressive symptoms among Latina and Latino farmworkers in the Midwest (Magaña & Hovey, 2003), and among Latinas and Latinos living in Western NC (Hiott et al., 2006), are similar to those of the three groups of Latinas in this study.

The percentage of Latina farmworkers and employed nonfarmworkers in this study with elevated depressive symptoms, although high, is less than that reported by Pulgar et al. (2016) for Latinas in farmworker families. A greater percentage of Latina farmworkers and employed nonfarmworkers in this study have elevated depressive symptoms than found among



Table 5  
*Stress, Anxiety, and Depression Symptoms Multivariable Models for Latina Farmworkers and Nonfarmworkers, North Carolina, 2012*

Personal characteristics	Stress			Anxiety <i>t</i> score			Depressive symptoms		
	LS mean	SE	<i>p</i> value	LS mean	SE	<i>p</i> value	LS mean	SE	<i>p</i> value
<b>Farmworker and nonfarmworker model</b>									
Farmworker status			<.0001			.0004			.3568
Farmworker	25.7	1.5		61.7	1.6		6.2	1.0	
Nonfarmworker	14.6	1.2		54.4	1.3		5.1	.8	
Age (years)			.0026			.4773			.2711
<30	22.7	1.4		55.8	1.5		4.1	1.0	
30–34	20.2	2.0		57.5	2.2		5.0	1.4	
35–44	24.3	1.5		58.4	1.7		6.5	1.1	
45+	13.4	2.5		60.4	2.7		7.0	1.7	
Education(years)			.0726			.4661			.5061
0–6	22.7	1.3		59.5	1.5		5.9	.9	
7–11	20.2	1.5		58.0	1.7		6.4	1.1	
12+	17.6	1.8		56.6	2.0		4.6	1.2	
Years in current residence			.5204			.3942			.3771
≤1	18.8	1.8		58.4	2.0		5.9	1.3	
2–4	21.3	1.4		56.4	1.5		4.6	1.0	
5+	20.4	1.4		59.3	1.6		6.4	1.0	
<b>Employed and unemployed model</b>									
Employment status			.0143			.0370			.1956
Employed	20.2	1.3		58.3	1.2		5.9	.7	
Unemployed	14.6	2.0		53.6	2.0		4.2	1.2	
Age (years)			.0343			.6343			.4140
< 30	21.2	1.7		54.6	1.7		3.7	1.0	
30–34	18.3	2.3		56.1	2.3		4.6	1.4	
35–44	19.0	1.7		54.6	1.7		5.7	1.0	
45+	11.1	3.0		58.5	3.0		6.3	1.8	
Education (years)			.0130			.2062			.4068
0–6	21.1	1.8		58.1	1.7		5.3	1.0	
7–11	17.4	1.8		56.0	1.7		6.0	1.0	
12+	13.7	2.1		53.7	2.1		3.9	1.3	
Years in current residence			.4336			.2705			.3172
≤1	15.5	2.1		56.0	2.1		5.3	1.3	
2–4	18.3	1.7		54.2	1.7		4.0	1.0	
5+	18.4	1.7		57.7	1.7		6.0	1.0	

Note. *n* = 95. LS = least squares; SE = standard error.

all Hispanic women and all women in the general United States population (Centers for Disease Control and Prevention, 2010; Pratt & Brody, 2014). The percentage of Latina farmworkers in this study with elevated depressive symptoms is similar to that of Latino NC farmworkers (Arcury et al., 2012), but lower than that found among largely male farmworkers from Nebraska (Ramos et al., 2015).

Almost no Latinas who participated in this study were at risk for alcohol dependence. This is in stark contrast to men who participated in the same study—37.9% of male farmworkers and 16.0% of male nonfarmworkers were at risk

for alcohol dependence (Arcury et al., 2016). Other studies report high levels of alcohol abuse among male farmworkers (García, 2008; Sánchez, 2015).

Several factors may explain the higher stress and anxiety levels among farmworkers and employed nonfarmworkers compared with unemployed Latinas, and the high levels of depressive symptoms. First among these are the conditions under which these women work. Immigrants have riskier jobs than nonimmigrants (Orrenius & Zavodny, 2009). Immigrant women work in extremely dangerous jobs in the most hazardous industries, including agricul-

ture, food preparation, and manufacturing. Safety regulations in these industries are often ignored. Their jobs are often contingent, and they often have nonstandard work schedules. These work organization characteristics are associated with mental health among Latina manual workers (Arcury, Trejo, et al., 2015). Workplace sexual harassment is another potential source of stress, anxiety, and depression among Latina workers. Although sexual harassment was not measured in this study, research is beginning to document the extent of harassment among Latina farmworkers (Kim, Vásquez, Torres, Nicola, & Karr, 2016; Murphy, Samples, Morales, & Shadbeh, 2015) and among hired youth Latino farmworkers (Arcury, Kearney, Rodriguez, Arcury, & Quandt, 2015). Work organization, safety, and sexual harassment problems are often unreported by Latina workers because these women are frequently undocumented, have limited education, have limited English language, and need the income to support their families (Arcury & Quandt, 2007; Rodriguez et al., 2016). They fear complaining will result in job loss or harassment from law enforcement.

Finally, Rodriguez et al. (2016) discussed how work-family balance, particularly the significant domestic responsibilities of employed Latinas, results in stress. This reflects the conclusions of others who document the stress of Latinas (Borrell, Muntaner, Benach, & Artazcoz, 2004; Guendelman, Malin, Herr-Harthorn, & Vargas, 2001; Hondagneu-Sotelo, 1992) and other low income working women (Hochschild & Machung, 1989). Stress was lower among the oldest women in this study; these were the women who were least likely to have young children at home. Domestic responsibilities can be especially burdensome when paid employment wages are low and organizational policies (e.g., lack of childcare and inflexible schedules) do not support work-family balance (Griggs, Casper, & Eby, 2013), conditions under which Latina immigrants are likely to work.

These results should be interpreted in light of this study's limitations. Participant recruitment involved community partners and was not random. The number of potential participants who refused to participate is not known. The number of participants, particularly when divided into the three groups, is relatively

small, and all were recruited from a single state, which is a new settlement destination for Latino immigrants. Therefore, care should be taken in generalizing the study results. Farmworker and nonfarmworker participants were recruited from different areas in the state; the different contexts for their lives (e.g., metropolitan vs. nonmetropolitan, and limited vs. substantial agriculture) could explain some of the findings. Diabetes is associated with depression. Individuals with diabetes were excluded from this study. This could have resulted in a selection bias with the sample being healthier than the general Latino immigrant population. Measures of mental health are limited, although these measures have been widely used in research with other Latino and farmworker communities. Measures for some potentially important variables, such as sexual harassment and domestic responsibilities, were not included in the questionnaire.

Even with these limitations, it is obvious that mental health among Latina farmworkers and other Latina manual workers is a major health concern. Concrete steps are needed to address what is known about the mental health of Latina farmworkers, and to continue documentation of mental health concerns and their causes in this population. Clinics providing care to Latina farmworkers need to be aware of the high levels of mental health distress experienced by this group of women, and should assess and treat their mental health distress in accordance with best clinical practices. Clinic outreach staff members also need to address the symptoms and causes of mental illness among women in the communities they serve. Organizations providing services and advocacy need to consider providing programs and other supports to address and mitigate the stress experienced by Latina workers. Both clinical and outreach services should be provided in linguistically and culturally appropriate formats. Research that documents the intersection of the organization of work, workplace occupational and interpersonal hazards, and domestic responsibilities among Latinas employed in manual occupations such as farm work, and the associations of these work and domestic factors on their mental and physical health, is needed. This research can inform public health and

occupational health policies that force changes in the way work is organized and in the way all workers are treated.

## References

- Alderete, E., Vega, W. A., Kolody, B., & Aguilar-Gaxiola, S. (2000). Lifetime prevalence of and risk factors for psychiatric disorders among Mexican migrant farmworkers in California. *American Journal of Public Health, 90*, 608–614. <http://dx.doi.org/10.2105/AJPH.90.4.608>
- Andresen, E. M., Malmgren, J. A., Carter, W. B., & Patrick, D. L. (1994). Screening for depression in well older adults: Evaluation of a short form of the CES-D (Center for Epidemiologic Studies Depression Scale). *American Journal of Preventive Medicine, 10*, 77–84.
- Arcury, T. A., Grzywacz, J. G., Chen, H., Mora, D. C., & Quandt, S. A. (2014). Work organization and health among immigrant women: Latina manual workers in North Carolina. *American Journal of Public Health, 104*, 2445–2452. <http://dx.doi.org/10.2105/AJPH.2013.301587>
- Arcury, T. A., Kearney, G. D., Rodriguez, G., Arcury, J. T., & Quandt, S. A. (2015). Work safety culture of youth farmworkers in North Carolina: A pilot study. *American Journal of Public Health, 105*, 344–350. <http://dx.doi.org/10.2105/AJPH.2014.302254>
- Arcury, T. A., O'Hara, H., Grzywacz, J. G., Isom, S., Chen, H., & Quandt, S. A. (2012). Work safety climate, musculoskeletal discomfort, working while injured, and depression among migrant farmworkers in North Carolina. *American Journal of Public Health, 102*, S272–S278. <http://dx.doi.org/10.2105/AJPH.2011.300597>
- Arcury, T. A., & Quandt, S. A. (2007). Delivery of health services to migrant and seasonal farmworkers. *Annual Review of Public Health, 28*, 345–363. <http://dx.doi.org/10.1146/annurev.publhealth.27.021405.102106>
- Arcury, T. A., Summers, P., Talton, J. W., Nguyen, H. T., Chen, H., & Quandt, S. A. (2015b). Job characteristics and work safety climate among North Carolina farmworkers with H-2A visas. *Journal of Agromedicine, 20*, 64–76. <http://dx.doi.org/10.1080/1059924X.2014.976732>
- Arcury, T. A., Talton, J. W., Summers, P., Chen, H., Laurienti, P. J., & Quandt, S. A. (2016). Alcohol consumption and risk for dependence among male Latino migrant farmworkers compared to Latino nonfarmworkers in North Carolina. *Alcoholism: Clinical and Experimental Research, 40*, 377–384. <http://dx.doi.org/10.1111/acer.12969>
- Arcury, T. A., Trejo, G., Suerken, C. K., Grzywacz, J. G., Ip, E. H., & Quandt, S. A. (2015). Work and health among Latina mothers in farmworker families. *Journal of Occupational and Environmental Medicine, 57*, 292–299. <http://dx.doi.org/10.1097/JOM.0000000000000351>
- Borrell, C., Muntaner, C., Benach, J., & Artazcoz, L. (2004). Social class and self-reported health status among men and women: What is the role of work organisation, household material standards and household labour? *Social Science & Medicine, 58*, 1869–1887. [http://dx.doi.org/10.1016/S0277-9536\(03\)00408-8](http://dx.doi.org/10.1016/S0277-9536(03)00408-8)
- Bradley, K. A., Boyd-Wickizer, J., Powell, S. H., & Burman, M. L. (1998). Alcohol screening questionnaires in women: A critical review. *JAMA: Journal of the American Medical Association, 280*, 166–171. <http://dx.doi.org/10.1001/jama.280.2.166>
- Castañeda, S. F., Rosenbaum, R. P., Gonzalez, P., & Holscher, J. T. (2012). Breast and cervical cancer screening among rural midwestern Latina migrant and seasonal farmworkers. *Journal of Primary Care & Community Health, 3*, 104–110. <http://dx.doi.org/10.1177/2150131911422913>
- Centers for Disease Control and Prevention (CDC). (2010). Current depression among adults—United States, 2006 and 2008. [MMWR]. *Morbidity and Mortality Weekly Report, 59*, 1229–1235. <https://www.cdc.gov/mmwr/preview/mmwrhtml/mm5938a2.htm>
- Chaney, B. H., & Torres, E. (2017). Covariates of identified stress and depression among seasonal farmworkers. *International Journal of Environmental Research and Public Health, 14*, 711. <http://dx.doi.org/10.3390/ijerph14070711>
- Cherpitel, C. J. (1999). Screening for alcohol problems in the U.S. general population: A comparison of the CAGE and TWEAK by gender, ethnicity, and services utilization. *Journal of Studies on Alcohol, 60*, 705–711. <http://dx.doi.org/10.15288/jsa.1999.60.705>
- Flocks, J., Kelley, M., Economos, J., & McCauley, L. (2012). Female farmworkers' perceptions of pesticide exposure and pregnancy health. *Journal of Immigrant and Minority Health, 14*, 626–632. <http://dx.doi.org/10.1007/s10903-011-9554-6>
- Flocks, J., Vi Thien Mac, V., Runkle, J., Tovar-Aguilar, J. A., Economos, J., & McCauley, L. A. (2013). Female farmworkers' perceptions of heat-related illness and pregnancy health. *Journal of Agromedicine, 18*, 350–358. <http://dx.doi.org/10.1080/1059924X.2013.826607>
- García, V. (2008). Problem drinking among transnational Mexican migrants: Exploring migrant Status and Situational Factors. *Human Organization, 67*, 12–24. <http://dx.doi.org/10.17730/humo.67.1.k204758425110781>
- Georges, A., Alterman, T., Gabbard, S., Grzywacz, J. G., Shen, R., Nakamoto, J., . . . Muntaner, C.

- (2013). Depression, social factors, and farmworker health care utilization. *The Journal of Rural Health, 29*, s7–s16. <http://dx.doi.org/10.1111/jrh.12008>
- Griggs, T. L., Casper, W. J., & Eby, L. T. (2013). Work, family and community support as predictors of work–family conflict: A study of low-income workers. *Journal of Vocational Behavior, 82*, 59–68. <http://dx.doi.org/10.1016/j.jvb.2012.11.006>
- Grzywacz, J. G., Alterman, T., Muntaner, C., Shen, R., Li, J., Gabbard, S., . . . Carroll, D. J. (2010). Mental health research with Latino farmworkers: A systematic evaluation of the short CES-D. *Journal of Immigrant and Minority Health, 12*, 652–658. <http://dx.doi.org/10.1007/s10903-009-9311-2>
- Grzywacz, J. G., Hovey, J. D., Seligman, L. D., Arcury, T. A., & Quandt, S. A. (2006). Evaluating short-form versions of the CES-D for measuring depressive symptoms among immigrants from Mexico. *Hispanic Journal of Behavioral Sciences, 28*, 404–424. <http://dx.doi.org/10.1177/2F0739986306290645>
- Grzywacz, J. G., Quandt, S. A., Chen, H., Isom, S., Kiang, L., Vallejos, Q., & Arcury, T. A. (2010). Depressive symptoms among Latino farmworkers across the agricultural season: Structural and situational influences. *Cultural Diversity and Ethnic Minority Psychology, 16*, 335–343. <http://dx.doi.org/10.1037/a0019722>
- Grzywacz, J. G., Quandt, S. A., Early, J., Tapia, J., Graham, C. N., & Arcury, T. A. (2006). Leaving family for work: Ambivalence and mental health among Mexican migrant farmworker men. *Journal of Immigrant and Minority Health, 8*, 85–97. <http://dx.doi.org/10.1007/s10903-006-6344-7>
- Guendelman, S., Malin, C., Herr-Harthorn, B., & Vargas, P. N. (2001). Orientations to motherhood and male partner support among women in Mexico and Mexican-origin women in the United States. *Social Science & Medicine, 52*, 1805–1813. [http://dx.doi.org/10.1016/S0277-9536\(00\)00296-3](http://dx.doi.org/10.1016/S0277-9536(00)00296-3)
- Harris, P. A., Taylor, R., Thielke, R., Payne, J., Gonzalez, N., & Conde, J. G. (2009). Research electronic data capture (REDCap)—a metadata-driven methodology and workflow process for providing translational research informatics support. *Journal of Biomedical Informatics, 42*, 377–381. <http://dx.doi.org/10.1016/j.jbi.2008.08.010>
- Hernandez, T., Gabbard, S., & Carroll, D. (2016). *Findings from the National Agricultural Workers Survey (NAWS) 2013–214: A demographic and employment profile of United States farmworkers* (Report No. 12). Retrieved from [https://doleta.gov/news/pages/research/docs/NAWS\\_Research\\_Report\\_12.pdf](https://doleta.gov/news/pages/research/docs/NAWS_Research_Report_12.pdf)
- Hiott, A. E., Grzywacz, J. G., Arcury, T. A., & Quandt, S. A. (2006). Gender differences in anxiety and depression among immigrant Latinos. *Families, Systems, & Health, 24*, 137–146. <http://dx.doi.org/10.1037/1091-7527.24.2.137>
- Hochschild, A. R., & Machung, A. (1989). *The second shift: Working parents and the revolution at home*. New York, NY: Viking Press.
- Hondagneu-Sotelo, P. (1992). Overcoming patriarchal constraints: The reconstruction of gender relations among Mexican immigrant women and men. *Gender & Society, 6*, 393–415. <http://dx.doi.org/10.1177/2F089124392006003004>
- Hovey, J. D., & Magaña, C. G. (2002). Exploring the mental health of Mexican migrant farm workers in the Midwest: Psychosocial predictors of psychological distress and suggestions for prevention and treatment. *The Journal of Psychology: Interdisciplinary and Applied, 136*, 493–513. <http://dx.doi.org/10.1080/00223980209605546>
- Hsieh, Y. C., Apostolopoulos, Y., Hatzudis, K., & Sönmez, S. (2016). Social, occupational, and spatial exposures and mental health disparities of working-class Latinas in the U.S. *Journal of Immigrant and Minority Health, 18*, 589–599. <http://dx.doi.org/10.1007/s10903-015-0231-z>
- Kim, N. J., Vásquez, V. B., Torres, E., Nicola, R. M., & Karr, C. (2016). Breaking the silence: Sexual harassment of Mexican women farmworkers. *Journal of Agromedicine, 21*, 154–162. <http://dx.doi.org/10.1080/1059924X.2016.1143903>
- Knoff, J. S., Harlow, S. D., Yassine, M., & Soliman, A. S. (2013). Cervical cancer screening practice and knowledge among Hispanic migrant and seasonal farmworkers of Michigan. *Journal of Primary Care & Community Health, 4*, 209–215. <http://dx.doi.org/10.1177/2F2150131913476303>
- Kohout, F. J., Berkman, L. F., Evans, D. A., & Cornoni-Huntley, J. (1993). Two shorter forms of the CES-D depression symptoms index. *Journal of Aging and Health, 5*, 179–193. <http://dx.doi.org/10.1177/2F089826439300500202>
- Luque, J. S., Castañeda, H., Tyson, D. M., Vargas, N., & Meade, C. D. (2012). Formative research on HPV vaccine acceptability among Latina farmworkers. *Health Promotion Practice, 13*, 617–625. <http://dx.doi.org/10.1177/2F1524839911414413>
- Magaña, C. G., & Hovey, J. D. (2003). Psychosocial stressors associated with Mexican migrant farmworkers in the midwest United States. *Journal of Immigrant Health, 5*, 75–86. <http://dx.doi.org/10.1023/A:1022955825650>
- May, J. J. (2009). Occupational injuries and illness in farmworkers in the eastern United States. In T. A. Arcury & S. A. Quandt (Eds.), *Latino farmworkers in the eastern United States: Health, safety, and justice* (pp. 71–101). New York, NY: Springer. [http://dx.doi.org/10.1007/978-0-387-88347-2\\_4](http://dx.doi.org/10.1007/978-0-387-88347-2_4)
- Mayfield, D., McLeod, G., & Hall, P. (1974). The CAGE questionnaire: Validation of a new alcohol-

- ism screening instrument. *The American Journal of Psychiatry*, *131*, 1121–1123.
- Morey, L. C. (1991). *Personality Assessment Inventory: Professional manual*. Odessa, TX: Psychological Assessment Resources.
- Murphy, J., Samples, J., Morales, M., & Shadbeh, N. (2015). "They talk like that, but we keep working": Sexual harassment and sexual assault experiences among Mexican indigenous farmworker women in Oregon. *Journal of Immigrant and Minority Health*, *17*, 1834–1839. <http://dx.doi.org/10.1007/s10903-014-9992-z>
- Orrenius, P. M., & Zavodny, M. (2009). Do immigrants work in riskier jobs? *Demography*, *46*, 535–551. <http://dx.doi.org/10.1353/dem.0.0064>
- Pratt, L. A., & Brody, D. J. (2014). Depression in the U.S. household population, 2009–2012. Retrieved from <https://www.cdc.gov/nchs/products/databriefs/db172.htm>
- Pulgar, C. A., Trejo, G., Suerken, C., Ip, E. H., Arcury, T. A., & Quandt, S. A. (2016). Economic hardship and depression among women in Latino farmworker families. *Journal of Immigrant and Minority Health*, *18*, 497–504. <http://dx.doi.org/10.1007/s10903-015-0229-6>
- Quandt, S. A., Walker, F. O., Talton, J. W., Summers, P., Chen, H., McLeod, D. K., & Arcury, T. A. (2016). Olfactory function in Latino farmworkers: Subclinical neurological effects of pesticide exposure in a vulnerable population. *Journal of Occupational and Environmental Medicine*, *58*, 248–253. <http://dx.doi.org/10.1097/JOM.0000000000000672>
- Ramos, A. K., Su, D., Lander, L., & Rivera, R. (2015). Stress factors contributing to depression among Latino migrant farmworkers in Nebraska. *Journal of Immigrant and Minority Health*, *17*, 1627–1634. <http://dx.doi.org/10.1007/s10903-015-0201-5>
- Rodriguez, G., Trejo, G., Schiemann, E., Quandt, S. A., Daniel, S. S., Sandberg, J. C., & Arcury, T. A. (2016). Latina workers in North Carolina: Work organization, domestic responsibilities, health, and family life. *Journal of Immigrant and Minority Health*, *18*, 687–696. <http://dx.doi.org/10.1007/s10903-015-0314-x>
- Rogers, R., Flores, J., Ustad, K., & Sewell, K. W. (1995). Initial validation of the Personality Assessment Inventory-Spanish version with clients from Mexican American communities. *Journal of Personality Assessment*, *64*, 340–348. [http://dx.doi.org/10.1207/s15327752jpa6402\\_12](http://dx.doi.org/10.1207/s15327752jpa6402_12)
- Runkle, J., Flocks, J., Economos, J., Tovar-Aguilar, J. A., & McCauley, L. (2014). Occupational risks and pregnancy and infant health outcomes in Florida farmworkers. *International Journal of Environmental Research and Public Health*, *11*, 7820–7840. <http://dx.doi.org/10.3390/ijerph110807820>
- Runkle, J. D., Tovar-Aguilar, J. A., Economos, E., Flocks, J., Williams, B., Muniz, J. F., . . . McCauley, L. (2013). Pesticide risk perception and biomarkers of exposure in Florida female farmworkers. *Journal of Occupational and Environmental Medicine*, *55*, 1286–1292. <http://dx.doi.org/10.1097/JOM.0b013e3182973396>
- Saitz, R., Lepore, M. F., Sullivan, L. M., Amaro, H., & Samet, J. H. (1999). Alcohol abuse and dependence in Latinos living in the United States: Validation of the CAGE (4M) questions. *Archives of Internal Medicine*, *159*, 718–724. <http://dx.doi.org/10.1001/archinte.159.7.718>
- Sánchez, J. (2015). Alcohol use among Latino migrant workers in South Florida. *Drug and Alcohol Dependence*, *151*, 241–249. <http://dx.doi.org/10.1016/j.drugalcdep.2015.03.025>
- SAS Institute. (2014). SAS 9.4 [Computer software]. Retrieved from [https://www.sas.com/en\\_us/software/sas9.html](https://www.sas.com/en_us/software/sas9.html)
- Winkelman, S. B., Chaney, E. H., & Bethel, J. W. (2013). Stress, depression and coping among Latino migrant and seasonal farmworkers. *International Journal of Environmental Research and Public Health*, *10*, 1815–1830. <http://dx.doi.org/10.3390/ijerph10051815>
- Zapata Roblyer, M. I., Grzywacz, J. G., Suerken, C. K., Trejo, G., Ip, E. H., Arcury, T. A., & Quandt, S. A. (2016). Interpersonal and social correlates of depressive symptoms among Latinas in farmworker families living in North Carolina. *Women & Health*, *56*, 177–193. <http://dx.doi.org/10.1080/03630242.2015.1086464>

Received November 2, 2017

Revision received February 13, 2018

Accepted March 3, 2018 ■