



Published in final edited form as:

J Rural Health. 2012 ; 28(3): 277–285. doi:10.1111/j.1748-0361.2011.00401.x.

Correlates of Mental Health among Latino Farmworkers in North Carolina

Rebecca Crain, BA,

Department of Family and Community Medicine, Wake Forest University School of Medicine, Winston-Salem, North Carolina

Joseph G. Grzywacz, PhD,

Department of Family and Community Medicine, Wake Forest University School of Medicine, Winston-Salem, North Carolina

Melody Schwantes, MMT,

Aalborg University, Denmark

Scott Isom, MS,

Department of Biostatistical Sciences, Division of Public Health Sciences, Wake Forest University School of Medicine, Winston-Salem, North Carolina

Sara A. Quandt, PhD, and

Department of Epidemiology and Prevention, Division of Public Health Sciences, Wake Forest University School of Medicine, Winston-Salem, North Carolina

Thomas A. Arcury, PhD

Department of Family and Community Medicine, Wake Forest University School of Medicine, Winston-Salem, North Carolina

Abstract

Latino farmworkers are a vulnerable population who confront multiple threats to their mental health. Informed by the stress-process model of psychiatric disorder, the goal of this paper is to determine personal and situational correlates of poor mental health among Latino farmworkers. Structured interview data were obtained from farmworkers (N=69) in six counties in eastern and western North Carolina. Results indicated that a substantial number of farmworkers have poor mental health, as indicated by elevated depressive symptoms (52.2%) and anxiety (16.4%). Results also indicated that each mental health outcome had different predictors. Addressing the mental health issues of farmworkers requires a comprehensive, multifaceted approach.

Rural health care providers face tremendous challenges meeting patients mental and behavioral health needs.¹ These challenges are exacerbated by the mental health needs of immigrant Latinos working in agriculture who confront substantial mental health risks, but for whom the rural health care system is poorly equipped to serve.^{2,3} Addressing the mental health needs of migrant and seasonal farmworkers in rural areas is a challenging task that requires better understanding of the factors that influence mental health outcomes.⁴

Research focused on farmworker mental health is sparse;⁵ nevertheless, available evidence suggests that poor mental health is common among farmworkers. California data suggests that one in five farmworkers have a history of major psychiatric disorder.⁶ Research from

the Midwest suggests that 20–40% of farmworkers have elevated symptoms of poor mental health. For example, Hovey and Magaña⁷ reported that 37.8% and 28.9% of farmworkers in Ohio and Michigan reported clinically significant levels of depression and anxiety, respectively. Hiott and colleagues⁴ reported that 40% of farmworkers in eastern North Carolina had clinically significant levels of depressive symptoms, and a comparable percentage of farmworkers had evidenced possible alcohol dependence and anxiety disorder. Substantial historical changes have taken place nationally and regionally since these previous papers were published, including strong and growing anti-immigration sentiment (see Arcury & Marin⁸), not to mention the regional experience of the “great recession”. Although not the focus of this paper, such macro-level forces have the potential to influence farmworker mental health.

Important progress has been made in the study of mental health of migrant and seasonal farmworkers. Early research by Vega and colleagues argued that environmental stressors confronted by farmworkers, such as restricted social mobility and discrimination, as well as dangerous working conditions pose significant threats to farmworker mental health.^{9;10} Hovey and Magaña^{7;11} expanded the range of stressors that may affect farmworker mental health by showing that psychosocial factors like poor family functioning, lack of social support, and involvement in the decision to immigrate and live a migrant farmworker lifestyle are associated with poorer mental health. Additional evidence suggests that social marginalization and separation from family may affect farmworker mental health.^{12;13} Most recently Grzywacz and colleagues¹⁴ documented diverse patterns of depressive symptoms across the agricultural season, and that both enduring stressors (e.g., separation of spouse) and more situation specific stressors (e.g., recent job demands) predicted depressive symptoms.

Missing from the immigrant farmworker mental health literature are studies that differentiate stressors inherent in farm work, or context-specific stressors, from more ambient or primary stressors such as those resulting from the amalgamation of economic hardship, acculturative stress, concerns related to documentation and experienced discrimination. The stress process model of psychiatric disorder¹⁵ argues that both primary and context-specific stressors are relevant for understanding mental illness, both because they can have independent effects on mental health outcomes and because the relative salience of primary and context-specific stressors can diverge across mental health outcomes. This point is supported by non-farmworker research indicating that primary stressors (like economic hardship) and context-specific stressors (like family conflict) contributed differentially to panic attack.¹⁶ Similarly, recent research found that normative stressors are more strongly associated with anxiety symptoms and comorbid anxiety and depression among immigrant Latinos, whereas context specific stress was more strongly associated with depressive symptoms.¹⁷ These results suggest that research differentiating farm work-specific stressors from more normative stressors may be useful for isolating whether the source of poor mental health among farmworkers is rooted in farm work-specific experiences or in more general life circumstances, thereby allowing more targeted interventions to help individuals effectively cope.

Another gap in the literature is inadequate attention to personal resilience factors. The stress process model also strongly argues that differences in coping resources, be they personal resources such as self-efficacy or social resources like social support, play a critical role in understanding the putative effects of stress exposure on mental health outcomes.¹⁵ Consistent with this cogent theoretical argument, fully 50–75% of farmworkers manifest no mental health problems despite confronting substantial stressors⁵ suggesting the presence of protective factors that ameliorate or otherwise circumvent the mental health effects of confronted stressors. Self-esteem has been identified as one of those protective factors in

previous research with farmworkers.⁷ Self-efficacy, a closely related concept reflecting an individual's appraisal of one's ability to obtain identified goals,¹⁸ is another salient factor widely believed to protect individuals from experienced stress, in part by shaping the way stressors are interpreted and appraised.^{19:20}

Self-efficacy is a compelling target for study on both a theoretical and practical level. Theoretically, self-efficacy likely acts by shaping stress appraisal and subsequent selection of the primary coping strategy to be used to address the stressor.^{18:20:21} Evidence suggests that individuals with lower self-efficacy tend to use emotion-focused coping over problem-focused coping, which is believed to be less effective in resolving encountered stressors.²² Farmworkers' ability to engage in problem-focused coping may be limited, in part because they have little direct control over several aspects of their job.²³ Nevertheless, the sense of mastery accompanying general self-efficacy likely has other protective qualities such as the ability to persevere in the face of difficulty.^{18:20} Practically, a focus on self-efficacy is compelling because previous research indicates that it is amenable to intervention thereby providing a potential tool for protecting farmworker mental health.¹⁷

Poor mental health among farmworkers is an issue that rural health care providers are likely to confront.¹⁻⁴ Unfortunately, understanding of farmworker mental health remains simplistic. Prevalence studies of poor mental health are important, but they provide little guidance for protecting or improving farmworker mental health. Personal and situational factors contributing to specific mental health outcomes need to be studied more closely within rural communities, so that health care workers, service providers and researchers working with this population can act strategically to protect and promote the mental health of this vulnerable population.

The goal of this study is to improve understanding of farmworker mental health, with particular emphasis on identifying potential targets for protecting or promoting mental health in the farmworker community. To accomplish this goal, we used data from a cohort of farmworkers in North Carolina to: (1) describe the mental health status of Latino farmworkers in eastern and western North Carolina and (2) identify personal and situational factors associated with depression and anxiety. Detecting determinants of specific mental health outcomes among farmworker populations is essential to targeting and coordinating health services that meet the health needs of this vulnerable group.

Materials & Methods

Data

The data for this study are from the baseline assessment of a pilot intervention designed to protect farmworker mental health. The intervention was fielded during the 2009 agricultural season (June – August) in eastern and western North Carolina. Estimates from the 2009 Census of Agriculture suggest that nearly 30% of farms in North Carolina rely on migrant or hired farmworkers suggesting that a large number, albeit unknown percentage of Latino farmworkers have an H2A visa, which allows temporary work in US agriculture. Farmworkers in the eastern region of North Carolina primarily engage in tobacco production, but there is also substantial sweet potato and cucumber production.⁸ Workers in the western region of North Carolina primarily engage in Christmas tree and tomato production. The pilot intervention tested whether farmworkers involvement in one of two structured group activities (i.e., English as a Second Language [ESL] class or Music Therapy) served as a protective factor for mental health in contrast to individuals who received written health education materials and a music CD.

Sampling & Recruitment

Twelve farmworker camps were selected for participation in the intervention study; the sample included six camps in eastern North Carolina (Harnett, Johnston, and Sampson counties) and six camps in the Western region of the state (Watauga, Avery, and Caldwell counties). Camps were identified using existing lists from ongoing farmworker outreach and research projects. Camps were purposefully selected based on size (i.e., minimum of six farmworkers residing in the camp) to ensure each camp would have adequate number of participants to support a group activity, and to ensure a mixture of workers with and without agricultural temporary work visas (H2A visas). Camps were randomly assigned to one of the three groups for the intervention.

Following random assignment of farmworker camps to study groups, trained interviewers were sent to each camp. The population of each camp was enumerated and all residents were invited to participate in the study. Interviewers informed camp residents that study participation would involve completing two assessments approximately six weeks apart. Individuals in the two treatment groups (i.e., ESL and Music Therapy) were also informed that they would be asked to participate in one weekly session lasting approximately one hour that would be held in the farmworker camp at the end of the work day. Residents were aware of the treatment that their camp would receive, but they were unaware of the alternative “treatments” being used. Residents were informed that they could participate in the sessions regardless of whether they completed the assessments. None of the residents present at the time of study introduction refused to participate. However, this refusal rate is likely under-estimated because residents could have passively refused participation by simply avoiding being seen and thereby not invited.

Data Collection

All data were collected through interviewer-administered questionnaires conducted in Spanish. All interviewers were fluent Spanish speakers. Interviewers participated in a six-hour training session, and each completed practice interviews before being approved to conduct study interviews. Interviewers worked in teams conducting one-on-one interviews with all residents in the camp interested in participating in the study. Interviews typically occurred in the evenings or on weekends. No incentive was provided to participants. Recruitment and data collection procedures were approved by two separate Institutional Review Boards.

Measures

Dependent variables—*Beck Anxiety Inventory (BAI)*²⁴ is a 21-item self-report inventory that measures common symptoms associated with anxiety. In this study, we used the Spanish version of the BAI developed by Navarro and Sanz.²⁵ Participants rate each item on a 4-point scale, 0 (not at all) to 3 (severely, I could barely stand it). Scores can range from 0 to 63 with higher scores indicating more anxiety symptoms. Scores were categorized using established conventions reflecting “minimal anxiety levels” (i.e., scores 0 to 7), “mild anxiety levels” (i.e., scores 8–15), “moderate anxiety levels” (i.e., scores of 16–25), and severe anxiety symptoms (i.e., scores 26–63). Results from validation studies suggest that the Spanish version of the BAI evidences discriminate and convergent validity, it has good reliability as indicated by strong estimates of internal consistency (e.g., $\alpha = 0.94$), and that the transfereability of content from the original Castilian Spanish to the Spanish used by immigrants from Latin America is good.^{26;27} *The Center for Epidemiological Studies-Depression Scale (CES-D)*²⁸ is a 20-item self-report inventory that measures depressive symptomology. The translated CES-D Spanish version has been determined a reliable and valid measure and is easily understood and used by Mexican American populations.^{9;29–31} Participants rate each item on a 4-point scale, 0 (rarely, or never (less than one day) to 3

(always (5–7 days), and total scores range from 0 to 60. Higher scores indicate a greater degree of depressive symptomology. Clinical caseness for CES-D is defined as score greater than or equal to 16 as suggested by Radloff.²⁸ Caseness designates the need for mental health services. The instrument has been shown to be reliable for Mexican immigrant samples, including migrant farmworkers.^{4;6;12}

Independent variables—Two general or ambient stressors were assessed. The first was *social isolation*, measured with a 3-item scale used in previous farmworker research.³² Ratings for the items were made on the 4-point definitely yes to definitely no scale. Higher scores reflected more social isolation. *Perceived Stress, the second measure of general stress*, was measured using the Perceived Stress Scale (PSS).³³ This 10-item self-report instrument measures perceived levels of stress using a 5-point frequency response option (0=never to 4=very often). PSS scores were obtained by reversing the scores on four positive items, and then summing across all 10 items. Higher scores indicated higher levels of perceived stress. There is no standard cutoff for this instrument. Farm work specific stress was assessed using the *Migrant Farmworker Stress Inventory* (MFWSI),³⁴ a 39-item self-report instrument measuring stress levels associated with the migrant farmworker lifestyle. Participants rated each item from 0 (*have not experienced*) to 4 (*extremely stressful*). Scores could range from 0 to 156. Each item is scored from 0 to 4. The total MFWSI score is obtained by summing the scores for all 39 items with higher scores indicating a greater degree of stress related to the migrant farmworker lifestyle. Caseness is reached with a score of 80, which represents approximately the upper 25% of scores. The notion of caseness signifies potentially significant symptomatology that may impair an individual's functioning. Individuals who score 80 or greater may be at greater risk for the experience of psychological difficulties. *Generalized Perceived Self Efficacy* was assessed using the Generalized Perceived Self Efficacy Scale (GSS).³⁵ Participants rated each item on this 10-item test on a 4-point scale, 1 (not at all) to 4 (exactly), and total scores ranged from 0 to 40. A higher score indicates a greater level of perceived self-efficacy. There is no standard cutoff for this instrument.

Demographic variables considered in this study were: age (18 to 24 years, 25 to 29 years, 30 to 39 years, 40 or more years), marital status (never married, married, living as married, widowed/separated/divorced), educational attainment (0 to 6 years, 7 to 9 years, 10 or more years), country of birth, language, years in agriculture (1 year or less, 2 to 3 years, 4 to 7 years, 8 or more years), H2A visa (yes or no).

Analyses

Descriptive statistics were calculated for personal and work characteristics and outcomes. Pearson correlations are used to show the raw relationship between mental health, stressors, and self-efficacy. Linear mixed models were used to assess the continuous depressive and anxiety symptoms scores. Camp was included as a random effect to account for the clustered design wherein study participants were nested within camps. For multivariate models, beta estimates are used to characterize the relationship between the independent variables and the outcomes. Generalized Estimating Equations (GEE) models were fit to predict potential clinical caseness of depression and anxiety. These models used a binomial distribution with a logit link and accounted for the clustering of the multiple observations within a camp. The multivariate GEE models used odds ratios to show the effect of an increase (one unit increase for all except age, which is a 5 year increase) in the independent variable on the probability of clinical caseness. All data analyses were performed using SAS 9.2 (SAS Institute, Cary, NC).

Results

The farmworkers in this sample were 30 years of age or older ($M = 33.3$, $SD = 10.89$), and most were currently married (66.7%) (Table 1). Educational attainment of the sample was modest: nearly one-half reported having 0 to 6 years of education, 36.2% reported having 7 to 9 years of education, and a small percentage (14.5%) with 10 or more years of education. All respondents were born in Mexico and spoke Spanish, although about 20% ($n=15$) also reported speaking English. Participants were experienced farmworkers; over 40% ($n=30$) reported 8 or more years working in US agriculture while another 17% reported having worked 4 to 7 years in US agriculture. Nearly three-quarters of the sample (71%) reported coming to the US on an H2A temporary work visa.

The mental health of farmworkers in this sample was poor (Table 2). Farmworker depression scores were, on average, 16.2 ($SD=6.3$), and fully 52.2% of the sample could be classified as having clinically meaningful depressive symptoms. Turning to anxiety, the average score was 10.4 ($SD=7.9$), but 16.4% ($n=11$) reported moderate to severe anxiety symptoms and 41.8% ($n=28$) reported mild anxiety symptoms. Farmworker stress scores were on average 57.7 ($SD=23$). Average self-efficacy scores were above the midpoint of the range of possible scores with a mean of 29.9 ($SD=4.9$), whereas social isolation and perceived stress scores were near the mid-range of possible scores with averages of 6.5 ($SD=1.7$) and 14.2 ($SD=5.1$), respectively.

A symptom-by-symptom examination of average scores offers insight into the meaning of the depressive symptoms and anxiety summary scores. Considering depressive symptoms first, the most frequently experienced symptom was an item reflecting interpersonal relations (i.e., I felt that I was just as good as other people), followed by an item tapping future orientation (i.e., I felt hopeful about the future) and general lethargy (i.e., I felt that everything I did was an effort). In terms of anxiety symptoms, participants were most bothered by the feeling that they were unable to relax. This dominant symptom was followed by an additional set items reflecting dread (i.e., fear of the worst happening, fear of dying) and feeling hot.

Bivariate analyses yielded a mixed pattern of results (Table 4). Scores on the MFWSI were moderately correlated with depressive ($r = 0.46$) and anxiety ($r = 0.35$) symptoms. There was no evidence that self-efficacy was correlated with either anxiety or depression. There was no evidence that social isolation was associated with depressive or anxiety symptoms. Normative stress, as assessed by the perceived stress scale, was modestly associated with greater anxiety symptoms ($r = 0.33$) but unassociated with depressive symptoms.

Table 5 presents the estimates obtained from two types of multivariate models. First, linear mixed models were specified to predict depressive and anxiety symptoms. Second, Generalized Estimating Equations (GEE) models were fit to predict potential clinical caseness of depression and anxiety. All models adjusted for the cluster effect of the camps. Considering symptoms first, results indicated that greater stress specific to farm work was associated with increased depressive and anxiety symptoms. Further, greater normative stress was independently associated with anxiety, but it was not associated with depressive symptoms. There was no evidence that feelings of social isolation or self-efficacy were associated with either depressive or anxiety symptoms. Turning to the models focused on possible caseness of depression or anxiety, self-efficacy was found to be associated with high levels of depressive symptoms. For every one-unit increase in self-efficacy, the odds of meeting potential caseness for depression decreased by 33%. None of the stressors differentiated individuals with high depressive or anxiety symptoms.

Discussion

Farmworker mental health is a pressing issue for rural health care providers.¹⁻⁴ Unfortunately, farmworker mental health remains poorly understood, particularly with regard to the role of farm work-specific versus normative stressors play in poor mental health. Also poorly understood are the personal factors that may promote resilience among farmworkers. The results of this study contribute to the small but growing literature focused on Latino farmworker mental health, and they offer some insight for health care workers, service providers and researchers seeking to protect the mental health of farmworkers. Nevertheless, it is important to interpret the results in the context of the study's limitations. The greatest limitation of this study is the inability to make causal inferences due to the cross-sectional nature of the data. Further, threats to the internal validity of the study include the use of a small, non-random sample with unknown biases that may have affected self-selection into the study, and potential confounding resulting from an unknown lifetime history of psychiatric disorder. Another limitation is the discrete scope of mental health outcomes considered in this study; future research is needed to delineate the potential effects of stressors and personal resilience factors on externalizing problems like anger, violence and substance abuse. Nevertheless, there are also important strengths to this study, including participation of farmworkers from a broad catchment area, the use of validated instruments, and the exploration of new concepts. While study limitations need acknowledgement, study strengths and the pattern of results make several contributions the literature focused on immigrant Latino farmworkers.

The results of this study further reinforce results of previous studies documenting poor mental health among Latino farmworkers (for review, see Grzywacz⁵). Over one-half of this sample met the cut-point for clinically significant depressive symptoms. Previous studies of depressive symptoms among farmworkers in North Carolina indicated that 40% of farmworkers met caseness for depression.^{4,12} However, the rate of elevated anxiety symptoms in this study (17%) is comparable to those observed in previous research. The apparent elevation in depressive but not anxiety symptoms is interesting. Elevated depressive symptoms in the current study may reflect several historical factors between the data collection periods (i.e., 2003 and 2009), like the US economic downturn as well as growing anti-immigration and immigration reform sentiment. Although it must be viewed as speculative, the potential of these macro-level forces to shape depressive symptoms can be seen in elements of data: feeling just as good as other people and feeling hopeful about the future were among the more common depressive symptoms reported by farmworkers.

Results from the analysis of farm work-specific and more normative or generalized stress contribute to the literature. Our analyses indicated that farm work-specific stressors confronted by Latino workers were associated with greater depressive and anxiety symptoms, but normative stress was only associated with anxiety symptoms. These results are consistent with recent results from a non-farmworker sample of Latino immigrants.¹⁷ Kiang and colleagues found that generalized stress, also assessed with the Perceived Stress Scale, was associated with anxiety but not depressive symptoms, while acculturative stress, a more specific stressor, was more clearly linked with depressive symptoms. Although firm conclusions cannot be drawn from two studies, the results are consistent with the stress process model of psychiatric disorder¹⁵, which argues that both primary and context-specific stressors must be considered when attempting to understand specific mental illnesses. If these results are replicated in additional research, it would suggest that interventions targeting more context-specific stressors such as those surrounding acculturation or those encountered in the workplace may be valuable for reducing depression, whereas interventions targeting more generalized or normative stressors may be needed to control anxiety among immigrant Latinos.

The last contribution of this study is evidence indicating that self-efficacy appears to protect farmworkers from elevated anxiety symptoms. These results are consistent with previous research by Hovey et al.¹¹ which found that self-esteem had protective effects for mental health. The observed and previous results support the theoretical argument that personal resources, like self-efficacy, are essential for understanding the mental health effects of stressor exposure because they likely shape how a stressor is appraised and which coping strategies will be used to address the stressor.^{15;18;20;21} The present results are meaningful for health care providers because evidence suggests that self-efficacy is subject to intervention,³⁶ suggesting that programs targeting improvements in self-efficacy could be a valuable tool for protecting farmworker mental health. In the context of rural health care, the application of cognitive behavioral techniques through brief clinical encounters or clinical outreach programs have been demonstrated to improve self-efficacy and contribute to better mental health.^{37–39} Although there is little precedent of applying cognitive behavioral techniques with farmworkers, there is a literature suggesting their effectiveness with Latinos.^{40;41}

Conclusion

Health care professionals in rural areas are likely to confront poor mental health when providing care to Latino farmworkers. Although understanding of farmworker mental health awaits further development, the results of this study suggest that elevated depressive symptoms are common among farmworkers. Stressors inherent in farm work are linked with both depressive and anxiety symptoms, whereas more ambient or normative stressors are only linked with anxiety. Outreach efforts that minimize stressors inherent in farm work or those that help farmworkers better cope with normative stressors, perhaps through the use of cognitive behavioral techniques, may be useful in protecting farmworker mental health.

Acknowledgments

This research was supported by a grant from the National Institute for Environmental Health Science (R01-ES008739).

Reference List

1. Badger L, Robinson H, Farley T. Management of mental disorders in rural primary care - A proposal for integrated psychosocial services. *Journal of Family Practice*. 1999; 48:813–818. [PubMed: 12224680]
2. Sherrill WW, Crew L, Mayo RM, Mayo WF, Rogers BL, Haynes DF. Educational and health services innovation to improve care for rural Hispanic communities in the US. *Education for Health*. 2005; 18:356–367. [PubMed: 16236583]
3. Lopez SR. A research agenda to improve the accessibility and quality of mental health care for Latinos. *Psychiatric Services*. 2002; 53:1569–1573. [PubMed: 12461217]
4. Hiott AE, Grzywacz JG, Davis SW, Quandt SA, Arcury TA. Migrant farmworker stress: Mental health implications. *Journal of Rural Health*. 2008; 24:32–39. [PubMed: 18257868]
5. Grzywacz, JG. *Latino Farmworkers in the Eastern United States*. New York, NY: Springer; 2009. *Mental health among farmworkers in the Eastern United States*.
6. Alderete E, Vega WA, Kolody B, Aguilar-Gaxiola S. Lifetime prevalence of and risk factors for psychiatric disorders among Mexican migrant farmworkers in California. *American Journal of Public Health*. 2000; 90:608–614. [PubMed: 10754977]
7. Hovey JD, Magaña C. Acculturative stress, anxiety, and depression among Mexican immigrant farmworkers in the Midwest United States. *Journal of Immigrant Health*. 2000; 2:119–131. [PubMed: 16228745]
8. Arcury, TA.; Marin, AJ. Latino/Hispanic Farmworkers and Farm Work in the Eastern United States: The Context for Health, Safety, and Justice. In: Arcury, TA.; Quandt, SA., editors. *Latino*

- Farmworkers in the Eastern United States: Health, Safety and Justice. New York, NY: Springer; 2009. p. 15-36.
9. Vega W, Warheit G, Palacio R. Psychiatric Symptomatology Among Mexican-American Farmworkers. *Social Science & Medicine*. 1985; 20:39–45. [PubMed: 3871969]
 10. Vega WA, Scutchfield FD, Karno M, Meinhardt K. The Mental Health Needs of Mexican-American Agricultural Workers. *American Journal of Preventive Medicine*. 1985; 1:47–55. [PubMed: 3870905]
 11. Hovey JD, Magana CG. Exploring the mental health of mexican migrant farm workers in the midwest: Psychosocial predictors of psychological distress and suggestions for prevention and treatment. *Journal of Psychology*. 2002; 136:493–513. [PubMed: 12431034]
 12. Grzywacz JG, Quandt SA, Early J, Tapia J, Graham CN, Arcury TA. Leaving family for work: ambivalence and mental health among Mexican migrant farmworker men. *Journal of Immigrant Minority Health*. 2006; 8:85–97.
 13. Hiott AE, Grzywacz JG, Arcury TA, Quandt SA. Gender differences in anxiety and depression and anxiety among immigrant Latinos. *Family, Systems & Health*. 2006; 24:137–146.
 14. Grzywacz JG, Quandt SA, Chen HY, et al. Depressive Symptoms Among Latino Farmworkers Across the Agricultural Season: Structural and Situational Influences. *Cultural Diversity & Ethnic Minority Psychology*. 2010; 16:335–343. [PubMed: 20658876]
 15. Pearlin, L. The stress process revisited: Reflections on concepts and their interrelationships. In: Aneshensel, CS.; Phelan, JC., editors. *Handbook of sociology of mental health, Handbook of sociology and social research*. New York, NY: Kluwer Academic Publishers; 1999. p. 395-415.
 16. Katerndahl DA, Parchman M. The ability of the stress process model to explain mental health outcomes. *Comprehensive Psychiatry*. 2002; 43:351–360. [PubMed: 12216010]
 17. Kiang L, Grzywacz JG, Marin AJ, Arcury TA, Quandt SA. Mental Health in Immigrants From Nontraditional Receiving Sites. *Cultural Diversity & Ethnic Minority Psychology*. 2010; 16:386–394. [PubMed: 20658882]
 18. Bandura, A. *Self-efficacy: the exercise of control*. New York, NY: Freeman; 1997.
 19. Ebstrup JF, Eplov LF, Pisinger C, Jorgensen T. Association between the Five Factor personality traits and perceived stress: is the effect mediated by general self-efficacy? *Anxiety Stress and Coping*. 2011; 24:407–419.
 20. Lazarus, RS.; Folkman, S. *Stress, Appraisal, and Coping*. New York: Springer; 1984.
 21. Jex SM, Bliese PD, Buzzell S, Primeau J. The impact of self-efficacy on stressor-strain relations: Coping style as an explanatory mechanism. *Journal of Applied Psychology*. 2001; 86:401–409. [PubMed: 11419800]
 22. Semmer, NK. Individual differences, work stress and health. In: Schabracq, MJ.; Winnubst, JA.; Cooper, CL., editors. *Handbook of Work and Health Psychology*. 2. Chichester, UK: Wiley; 2003. p. 83-120.
 23. Grzywacz JG, Quandt SA, Arcury TA. Immigrant farmworkers' health-related quality of life: an application of the job demands-control model. *Journal of Agricultural Safety and Health*. 2008; 14:79–92. [PubMed: 18376537]
 24. Beck, A.; Steer, R. *Beck anxiety inventory manual*. San Antonio, TX: Harcourt Brace; 1993.
 25. Sanz J, Navarro ME. Propiedades psicométricas de una versión española del Inventario de Ansiedad de Beck (BAI) en estudiantes universitarios. *Ansiedad y Estrés*. 2003; 9:59–84.
 26. Magan I, Sanz J, Garcia-Vera MP. Psychometric Properties of a Spanish Version of the Beck Anxiety Inventory (BAI) in General Population. *Spanish Journal of Psychology*. 2008; 11:626–640. [PubMed: 18988448]
 27. Novy DM, Stanley MA, Averill P, Daza P. Psychometric comparability of English- and Spanish-language measures of anxiety and related affective symptoms. *Psychological Assessment*. 2001; 13:347–355. [PubMed: 11556271]
 28. Radloff LS. The CES-D Scale: a self-report depression scale for research in the general population. *Applied Psychological Measurement*. 1977; 1:385–401.
 29. Hovey JD. Depression in migrant farmworkers. *Farmworker News*. 2001; 7:1.

30. Golding JM, Aneshensel CS. Factor structure of the Center for Epidemiologic Studies Depression Scale among Mexican American and non-Hispanic whites. *Psychological Assessment*. 1989; 1:163–168.
31. Golding JM, Aneshensel CS, Hough RL. Responses to Depression Scale Items Among Mexican-Americans and Non-Hispanic Whites. *Journal of Clinical Psychology*. 1991; 47:61–75. [PubMed: 2026780]
32. Hawthorne G. Measuring social isolation in older adults: Development and initial validation of the friendship scale. *Social Indicators Research*. 2006; 77:521–548.
33. Cohen S, Kamarck T, Mermelstein R. A Global Measure of Perceived Stress. *Journal of Health and Social Behavior*. 1983; 24:385–396. [PubMed: 6668417]
34. Magaña CG, Hovey JD. Psychosocial stressors associated with Mexican migrant farmworkers in the Midwest United States. *Journal of Immigrant Health*. 2003; 5:75–86. [PubMed: 14512761]
35. Swarzer, R.; Jerusalem, M. Generalized self-efficacy scale. In: Weinman, J.; Wright, S.; Johnston, M., editors. *Measures in Health Psychology: A user's portfolio. Causal and Control Belief*. Windsor, UK: NFER-NELSON; 1995. p. 35-37.
36. Eden D, Aviram A. Self-Efficacy Training to Speed Reemployment - Helping People to Help Themselves. *Journal of Applied Psychology*. 1993; 78:352–360.
37. Brown JSL, Elliott SA, Boardman J, Andiappan M, Landau S, Howay E. Can the effects of a 1-day CBT psychoeducational workshop on self-confidence be maintained after 2 years? A naturalistic study. *Depression and Anxiety*. 2008; 25:632–640. [PubMed: 17941095]
38. Hamblen JL, Norris FH, Pietruszkiewicz S, Gibson LE, Naturale A, Louis C. Cognitive Behavioral Therapy for Postdisaster Distress: A Community Based Treatment Program for Survivors of Hurricane Katrina. *Administration and Policy in Mental Health and Mental Health Services Research*. 2009; 36:206–214. [PubMed: 19365725]
39. Suvog C, Sood E, Comer JS, Kendall PC. Changes in Emotion Regulation Following Cognitive-Behavioral Therapy for Anxious Youth. *Journal of Clinical Child and Adolescent Psychology*. 2009; 38:390–401. [PubMed: 19437299]
40. Aguilera A, Garza MJ, Munoz RF. Group Cognitive-Behavioral Therapy for Depression in Spanish: Culture-Sensitive Manualized Treatment in Practice. *Journal of Clinical Psychology*. 2010; 66:857–867. [PubMed: 20549680]
41. Hinton DE, Lewis-Fernandez R, Pollack MH. A Model of the Generation of Ataque de Nervios: The Role of Fear of Negative Affect and Fear of Arousal Symptoms. *Cns Neuroscience & Therapeutics*. 2009; 15:264–275. [PubMed: 19691546]

Table 1

Farmworkers, Eastern and Western North Carolina, 2009 (N = 69).

	Sample	
	N	%
Sex		
Male	69	100.0
Age		
18 to 24 years	18	26.1
25 to 29 years	9	13.0
30 to 39 years	20	29.0
40 or more years	22	31.9
Marital Status		
Never married	20	29.0
Married	46	66.7
Living as married	2	2.9
Widowed/Separated/Divorced	1	1.4
Educational attainment		
0 to 6 years	34	49.3
7 to 9 years	25	36.2
10 or more years	10	14.5
Country of Birth		
Mexico	69	100
Language		
Speaks English	15	21.7
Speaks Spanish	69	100
Speaks Indigenous Language	6	8.7
Years in US agriculture		
1 year or less	7	10.1
2 to 3 years	20	29.0
4 to 7 years	12	17.4
8 or more years	30	43.5
H2A visa		
No	20	29.0
Yes	49	71.0

Table 2

Descriptive statistics for farmworker mental health and mental health-related covariates

	N	Mean	%	Standard Deviation	Range
Depression	67	16.2		6.3	4–39
Caseness	35		52.2		
Anxiety	67	10.4		7.9	0–33
Mild	28		41.8		
Moderate to Severe	11		16.4		
Total Caseness	39		58.2		
MFWSI	67	57.7		23.0	18–126
Self-Efficacy	68	29.9		4.9	19–40
Social Isolation	68	6.5		1.7	3–11
Perceived Stress	69	14.2		5.1	4–26

Table 3

Average response to mental health symptoms by Latino farmworkers in NC ordered by frequency (for depressive symptoms) and intensity (anxiety symptoms).

Frequency in the past week	Depressive Symptoms [‡]		Anxiety Symptoms [†]	
	M (SD)	In the past week how much have you been bothered by...	M (SD)	
I felt that I was just as good as other people. (R)	1.41 (1.00)	Unable to relax.	1.07 (0.92)	
I felt hopeful about the future. (R)	1.32 (1.13)	Fear of the worst happening.	0.86 (0.97)	
I felt that everything I did was an effort.	1.29 (1.06)	Fear of dying.	0.80 (0.99)	
I enjoyed life. (R)	1.06 (1.10)	Feeling hot.	0.80 (0.96)	
I talked less than usual.	0.96 (0.81)	Dizzy or lightheaded.	0.74 (0.89)	
I was happy. (R)	0.93 (1.00)	Nervous.	0.72 (0.76)	
I felt lonely.	0.91 (0.97)	Unsteady.	0.65 (0.80)	
I felt sad.	0.90 (0.71)	Heart pounding or racing.	0.58 (0.79)	
People were unfriendly.	0.86 (0.94)	Fear of losing control.	0.57 (0.87)	
I felt depressed.	0.74 (0.74)	Sweating (not due to heat).	0.49 (0.87)	
I felt that I could not shake off the blues even with help from my family or friends.	0.71 (0.73)	Indigestion or discomfort in abdomen.	0.48 (0.74)	
I had trouble keeping my mind on what I was doing.	0.70 (0.60)	Numbness or tingling.	0.46 (0.68)	
I felt that people dislike me.	0.66 (0.92)	Hands trembling.	0.39 (0.60)	
I did not feel like eating; my appetite was poor.	0.65 (0.80)	Wobbliness in legs.	0.36 (0.69)	
My sleep was restless.	0.65 (0.75)	Scared.	0.33 (0.63)	
I could not get "going".	0.64 (0.79)	Difficulty breathing.	0.32 (0.68)	
I was bothered by things that usually don't bother me.	0.57 (0.67)	Shaky.	0.29 (0.55)	
I felt fearful.	0.51 (0.66)	Terrified.	0.26 (0.56)	
I had crying spells.	0.49 (0.72)	Feelings of choking.	0.22 (0.51)	
I thought my life had been a failure.	0.41 (0.65)	Face flushed.	0.21 (0.41)	
		Faint.	0.07 (0.31)	
Summary Score	16.24 (6.33)	Summary Score	10.43 (7.94)	

[‡] Items are from the Center for Epidemiological Studies Depression Scale;

[†] items are from the Beck Anxiety Inventory

Table 4

Pearson bivariate correlations of mental health with stressors and self-efficacy.

	(1)	(2)	(3)	(4)	(5)
Depression (1)	1.00				
Anxiety (2)	0.41**	1.00			
MFWSI (3)	0.46**	0.35**	1.00		
Self-Efficacy (4)	-0.13	-0.08	-0.04	1.00	
Social Isolation (5)	-0.05	-0.17	-0.09	-0.07	1.00
Perceived Stress (6)	0.22	0.33**	0.07	-0.20	0.05

* $p < .05$

** $p < .01$ (two-tailed)

Table 5

Estimated multivariate associations of stressors with mental health outcomes

	Depressive Symptoms b (SE)	Anxiety Symptoms b (SE)	Depressive Caseness [‡] OR (95% CI)	Anxiety Caseness [‡] OR (95% CI)
Social Isolation	-0.05 (0.42)	-0.53 (0.52)	1.04 (0.80, 1.35)	0.95 (0.69, 1.31)
Perceived Stress	0.20 (0.14)	0.47 (0.18)*	1.11 (0.99, 1.25)	1.02 (0.92, 1.14)
MFWSI	0.12 (0.03)**	0.11 (0.04)**	1.06 (1.03, 1.09)**	1.04 (1.02, 1.06)**
Self-Efficacy	-0.10 (0.15)	0.001 (0.19)	0.96 (0.86, 1.06)	0.89 (0.81, 0.98)*
Covariate				
Age	-0.02 (0.07)	-0.04 (0.09)	1.46 (1.10, 2.06)**	0.95 (0.76, 1.20)

Note: All models account for clustering of participants within farmworker camps

*
 $p < .05$ **
 $p < .01$ (two-tailed)[‡] A dichotomous outcome as a binomial outcome

Odds Ratios (OR) presented are for a one unit increase except for age, which is for a five year increase