Assessing Farm Stress and Community Supports in a U.S.-Mexico Border County

A. J. Keeney [Lecturer],

School of Social Work, San Diego State University, San Diego, California, and Evaluator, High Plains Intermountain Center for Agricultural Health and Safety, Fort Collins, Colorado;

P. J. Hernandez [Graduate Research Assistant],

School of Social Work, San Diego State University Imperial Valley, Calexico, California;

Y. Meng [Youth, Family, and Community Advisor]

Imperial County Cooperative Extension, Holtville, California.

Abstract

Imperial County, California, is a high-need, medically underserved area that has some of the worst overall health outcomes of all California counties. Given this and the high depression and anxiety rates in agricultural occupations, Imperial County farmers and ranchers may be at an increased risk of stress and poor mental health outcomes. An exploratory mixed methods assessment was used to collect information from 24 farmers and ranchers in Imperial County. Survey topics included questions about farm or ranch operations, farm-related stress, mental health, community support, and health behaviors. The results indicate that most respondents perceive unpredictable factors, such as government regulations, as the most impactful stressors related to their farm or ranch operations. Additionally, depression symptomatology scores were positively correlated with respondents' ability to obtain credit. Efforts to understand farm-related stress and how community support can help Imperial County farmers and ranchers mediate adverse physical and mental health effects through formal and informal networks are considered.

Keywords

Community supports; Farm-related stress; Farmers and ranchers; Mental health; U.S.-Mexico border

---

In 2018, almost $50 billion was generated by California agriculture, which included two-thirds of the country's fruits and nuts and one-third of the country's vegetables (CDFA, 2018). The scale of California's agricultural production is often overshadowed by the state's entire economy, as California has one of the largest economies globally. Specifically, this can translate to little recognition or understanding of the physical and emotional demands associated with agriculture production because the perceived role of farmers and ranchers is minimized by the state's entire economy. Efforts to reduce work-related stress and

Corresponding author: Annie J. Keeney, 5500 Campanile Drive, San Diego, CA 92182-4119; phone: 509-680-3047; akeeney@sdsu.edu.

mental health issues among farmers is a priority for occupational health and safety agencies interested in risk management and reduction.

In 2016, farming, forestry, and fishing occupations ranked fourth in suicides, with a reported suicide rate of 31.4 per 100,000 males (Peterson et al., 2020). Studies have reported an increased prevalence of depression among farmers compared to other labor-intensive occupations (Scarth et al., 2000; Stallones et al., 1995; Butterworth et al., 2009), with depression associated with an increased risk of suicidality (Butterworth et al., 2009; Chesney et al., 2014). Factors proposed to account for this risk include access to firearms, financial difficulties, a sense of personal failure with the loss of a family farm, a functional attitude toward death, increased psychiatric morbidity, personality factors, isolation, lack of social support, lack of personal meaning in life, and high levels of occupational stress (Judd et al., 2006). A high-demand work environment and unpredictable factors can compound farm-related stress, strain, mental health, and depression (Lunner Kolstrup et al., 2013; Gregoire, 2004). Previous studies have demonstrated that stressors have been found to contribute to poor health outcomes and injuries (Schneiderman et al., 2005; Thu et al., 1997), and agricultural, forestry, and fishing workers are at an excessive risk of suicide (Klingelschmidt et al., 2018).

Suicide is the ninth leading cause of death in California and the third leading cause of death in Imperial County, one of two U.S.-Mexico border counties in California (CDC, 2020; Imperial County, 2016). Imperial County is more rural than most areas in California because of its extreme summer climate and vast agricultural lands. This region boasts a $2 billion agriculture industry with over 100 different commodities grown year-round (IVEDC, 2019). The U.S. Health Resources and Services Administration has identified Imperial County as a high-need, medically underserved geographic area (DHHS, 2019). Imperial County has the highest poverty rate of all California counties (28% living in poverty), a tuberculosis rate more than triple the statewide rate, the highest child asthma hospitalization rate, and a high percentage of obesity compared to California as a whole (Imperial County, 2016). Most recently, public health data indicate that Imperial County has the highest per capita rate of COVID-19 cases in the state, with one in four testing positive for the virus (Cavanaugh and Finn, 2020).

Additionally, many farmers and ranchers in Imperial County depend on workers who commute daily from Mexicali, the capital of Baja California, Mexico (Martin, 2001). Border closures as a response to COVID-19 and continued immigration concerns on a national level could mean a lack of skilled, affordable labor for Imperial County farmers and ranchers, thus increasing farm-related stress. Farm-related stress may be more pronounced in rural areas that have overall poor public health outcomes and limited access to healthcare. Studies have shown that strengthening factors such as transportation, faith, education, and businesses within rural communities can improve health and well-being (NAP, 2018). Furthermore, studies have shown that community support networks may have a meaningful impact on suicide prevention efforts (Fountoukalis et al., 2010; Cooper et al., 2006).

Purpose of Study

Despite the known mental health risks that agricultural communities experience, the farm-related stressors specific to farmers and ranchers in a U.S.-Mexico border county that has the highest concentration of Hispanic/Latino populations of all California counties are relatively unknown. In this study, an exploratory assessment, triangulated with quantitative and qualitative data applying the stress and coping theory, was used to assess: (1) how Imperial County farmers and ranchers experience stress and other mental health issues, and (2) how those issues are managed in a medically underserved area. Stress theory contends that stressors prompt individual efforts to cope with the emotional and behavioral reactions triggered by those stressors (Lazarus and Folkman, 1984; Thoits, 1995). We describe the levels of stress and depression among Imperial County farmers and ranchers, and the role that community support networks play in their lives. We hope the results provide preliminary data to inform the development of responsive outreach and intervention strategies specific to this border-serving farm community.

Materials and Methods

For this exploratory assessment, we sought participation from farmers and ranchers in Imperial County who were at least 18 years old. A southwest university institutional review board approved the study instrument and procedures. Data collection involved a tiered approach. First, the identified farmers and ranchers were asked to complete a survey on farm-related stress using Qualtrics online survey software. Second, participants who completed the online survey and indicated a willingness to share their perceptions related to farm-related stress and coping strategies through a key informant interview were asked to provide their contact information. We offered a $20 gift card for participants' time spent in the key informant interview. Unfortunately, COVID-19 greatly affected Imperial County farmers and ranchers due to the pandemic's significant impacts on production, labor, and regulations. As such, scheduling a phone or video call was extremely difficult when we reached out to these participants individually. However, most of the interested participants expressed a willingness to answer the interview questions via a short-answer form. We modified the data collection method from a key informant interview to a short-answer form to ease accessibility. Only participants who self-selected to participate in the key informant interview (turned short-answer form) were given a $20 gift card for their time.

Recruitment Procedure

We initially used a purposeful sampling method to recruit Imperial County farmer and rancher participants. In early March 2020, we gave a presentation at the Imperial County Farm Bureau and UC Cooperative Extensive office, where we handed out flyers and asked those interested to complete the online survey. All recruitment materials were offered in both English and Spanish. Due to the COVID-19 pandemic, our recruitment efforts were altered, and in-person meetings, expos, and conferences were no longer viable. As a result, all further recruitment efforts relied on more passive methods, such as individualized e-mails to UC Extension clients, electronic newsletter announcements, phone calls, and social media. Additionally, we employed snowballing methods with participants who completed the online

survey and indicated an interest in responding to the short-answer form. Our reliance on e-mail, agriculture social media, and the snowballing methods of farmers, ranchers, and industry stakeholders in passing on the recruitment information compromised our ability to accurately calculate a response rate for the online survey. However, a total of 24 farmers and ranchers completed the online survey, and seven of those respondents self-selected and completed the short-answer form, for a 29% response rate

Instrumentation

Selected items from the Farm Stress Survey (FSS), initially developed by the National Institute of Occupational Safety and Health (NIOSH) (CDC, 2017), were used to measure the stress experienced by Imperial County farmers and ranchers. The online survey was comprised of items related to farm characteristics, social support, mental health, physical health, farm and family economics, and known stressors to farmers and ranchers (e.g., weather, debt load, government regulations). Sample items included: "How have government regulations and policies affected your farm/ranch operation?", "How would you rate the quality of your family or home/living situation?", and "Is your current financial situation the same, worse, or better than it was five years ago?" Mental health items on the FSS comprised of the 20 items from the Center for Epidemiologic Studies depression screening scale (CES-D) (Radloff, 1977). Sample items included: "During the past week I was bothered by things that usually don't bother me", "During the past week my sleep was restless", and "During the past week I felt that everything I did was an effort." Respondents indicated how often they experienced each item by selecting: rarely (less than 1 day), some (1 to 2 days), occasionally (3 to 4 days), or most (5 to 7 days). Cronbach's analysis for the CES-D scale found excellent reliability ($\alpha = 0.84$), which is consistent with previous research (Hann et al., 1999). The FSS has yet to be field-tested in its entirety (CDC, 2017).

We modified the semi-structured key informant interview for use as a short-answer form for participants who completed the online survey and self-selected to participate in the interview portion of the study. Eleven open-ended questions were used to collect qualitative data. The questions examined coping strategies, use of healthcare, and perceived sources of community support. Sample questions included: "What community resources would you use to help cope with stress if they were available?" and "Are there things in your life/farm/ ranch operation that cause you stress?"

Data Analysis

Data collected from the online survey were uploaded into SPSS (v. 25) for analysis. Because one of the goals of this study was to describe the type and severity of stressors experienced, physical functioning, mental health symptoms, and social supports, we used univariate analysis to explore the overall characteristics of the sample. To assess differences between the level of stress and depression scores, we used bivariate analysis.

Data collected from the short-answer questions were compiled and uploaded into a word processing program in which a meta-matrix was constructed to record the extracted information from each respondent. Two short-answer responses were translated from

Spanish to English verbatim before being uploaded into the meta-matrix. We used a qualitative procedure of cross-case analysis to analyze the data. Themes were identified that cut across all cases (Krueger and Casey, 2009; Miles and Huberman, 1994). Inter-rater reliability between the researchers was 95%.

Results

Data were collected over four months (March to June 2020) from 24 farmers and ranchers in Imperial County, California. Most of the respondents were male (n = 20; 83%), and four identified as female (17%). The average age of the respondents was 47 years, and 75% of them were married. Slightly less than half (48%) reported that their farm or ranch organization was part of a family farm, and more than half (56.5%) were an owner or operator. One respondent did not specify a role on the farm or the type of organization (table 1). Race and ethnicity were only collected from seven respondents, resulting in missing data for 17 respondents. Of the seven respondents, 70% identified as white, 50% identified as Hispanic/Latino or Mexican (50%), and one identified as East Indian.

Univariate and Bivariate Analysis

General Health and Well-Being

The respondents perceived their family or home life as slightly above "a little supportive," as indicated by a mean score of 2.29 (on a scale of 1 to 5, with 1 = not at all supportive and 5 = extremely supportive) for the item: "How would you rate the quality of your family or home/living situation?" In addition, 62.5% of the respondents reported attending religious services several days a week during the past year, and 50% reported being "somewhat likely" and "very likely" to visit a counselor if they were under severe pressure. Regarding the respondents' current financial situation, 37.5% described it as "about the same" as it was five years ago, 25% reported "a little or much worse," and 37.5% reported "a little or much better." Of the 24 respondents, 54.2% reported being in "good" health. Table 2 lists the numbers and percentages of the respondents who reported health concerns.

Stressors

The respondents were asked: "Listed below are a few items that some farmers/ranchers have mentioned as causing them stress in managing their farm/ranch operation. Please indicate whether each of these items causes you stress on a scale of 1 to 4 (1 = no stress, 2 = slight stress, 3 = moderate stress, and 4 = severe stress) in managing your farm operation." Table 3 lists the mean, standard deviation (SD), and skewness of the five key stressors. The highest perceived stressor was government regulations and policies (mean = 3.42, SD = 0.717), which scored almost one point higher than weather, the second-ranked stressor (mean = 2.67, SD = 0.92), followed by debt load (mean = 2.46, SD = 1.06) and the ability to obtain credit (mean = 2.2, SD = 0.932). Having young children on the farm or ranch (mean = 2.13, SD = 1.01) was the lowest perceived stressor for the respondents.

The CES-D scale has a cutoff score of 16 points, meaning that a score of 16 or higher indicates the presence of symptomatology associated with clinical depression. Possible CES-D scores can range from 0 to 60, with higher scores indicating the presence of more

symptomatology. Figure 1 shows the relative frequencies of the respondents' CES-D scores. More than half (56.3%) of the respondents had CES-D scores of 16 or greater. The mean score was 19.39, and the scores ranged between 3 and 57.

To investigate if there was a statistically significant association between CES-D scores and key stressors (e.g., debt load, government regulations), correlations were computed. The CES-D scores were skewed (skewness = 1.61), which violated the assumption of normality. Thus, the Spearman rho statistic was calculated between CES-D scores and the ability to obtain credit: $r(24) = 0.56$, $p = 0.005$. The direction of the correlation was positive, which means that respondents with higher CES-D scores tended to have higher stress associated with their ability to obtain credit in managing their farm or ranch operation. Additionally, a significant association was found between CES-D scores and government regulations and policies: $r(24) = 0.45$, $p = 0.032$. Again, the direction of the correlation was positive, which means that respondents with higher CES-D scores tended to have higher stress associated with government regulations and policies in managing their farm or ranch operations. According to Cohen's (1988) guidelines, the effect sizes are large and between medium and large for studies in this area (table 4).

Simple regression was conducted to investigate how well the farm-related stressors predicted CES-D scores. The ability to obtain credit was found to be statistically significant, $F(1,21) = 12.41$, $p = 0.002$. The adjusted R^2 value was 0.372. This indicates that 37% of the variance in CES-D scores was explained by stress related to the respondent's ability to obtain credit. According to Cohen's (1988) guidelines, this is a large effect. The stress associated with government regulations and policies as a predictor of CES-D score approached statistical significance: $F(1,21) = 3.35$, $p = 0.082$.

Cross-Case Analysis

The qualitative data were analyzed for the seven respondents who self-selected to complete the short-answer form. The responses were varied; however, some patterns emerged from the data. Most respondents felt that the Imperial Valley farming community was supportive; however, one respondent indicated a lack of support for field workers, and another respondent shared that, on the whole, there was a lack of support from the government for agricultural communities. All respondents reported experiencing stress associated with their farm or ranch operations. Their reported stress reflected three common areas: commodity prices, government taxes and regulations, and concerns about the health and safety of workers and family members. Three respondents reported that farm-related stress impacted their family or children as follows: (1) land could not be worked because the respondent was primary caregiver for an ill spouse, (2) physically demanding work often left the respondent very tired, and (3) the work consumed all of the respondent's time.

The respondents were divided in their willingness to talk to someone about stress. Two respondents reported "yes", two indicated "maybe" or "depends", and two said that they would discuss stress only with their immediate family members or spouses. Willingness to discuss stress only with immediate family was explained by one respondent who stated: "Most farmers have a very tough guy mentality and don't want to be seen as soft or showing

emotions on their sleeves." When asked how they would go about finding someone to talk to about stress, a dominant theme of informal network reliance emerged. In other words, the respondents mentioned support groups, faith, family, church pastors, and friends as ways to seek help. One only participant mentioned asking a primary care physician. All but one respondent mentioned active involvement in their communities through churches or faith-based organizations, 4-H, farmer networks, and coaching youth sports.

A variety of responses was elicited by the question: "What is particularly frustrating or helpful about being a farmer or rancher in Imperial County?" Reported frustrations included a high prevalence of asthma and air quality problems, misconceptions and lack of awareness regarding careers in agriculture, property taxes, vandalism of property, lack of support for field workers, heat, and California regulations that make it difficult to compete with other states and countries with fewer regulations. Several of these frustrations were reflected in the responses to "Are there things in your life/farm/ranch that cause you stress?" as reported above. The acreage zoned for agriculture or renewable energy was perceived as a favorable aspect of the county. No other supportive community aspects were reported specific to Imperial County.

Lastly, the respondents highlighted several additional areas that they felt were important for the researchers to know. These included environmental factors and vacant land, uncertainty about the future of farming, owing money to buy farmland, availability of water, concerns about new labor laws, profitability of the business to pay off debt, cost of irrigation water (e.g., growers leaving Imperial County for Arizona), cleaning up the Salton Sea to reduce area pollutants, destruction of crops due to COVID-19, beef and dairy ranchers unable to sell their livestock and milk, and lack of public support.

Discussion

The results provide novel insights into how farmers and ranchers in a geographically unique area are experiencing farm-related stress. It is presumed that Imperial County farmers and ranchers struggle with the uncertainty of skilled and affordable labor, given their reliance on farmworkers who commute from Mexico. However, we found that there are additional stressors that extend beyond labor support (e.g., environmental factors, uncertainties for the future) that could be contributing to the clinical depression symptomology that most Imperial County farmers and ranchers were experiencing.

On the CES-D scale, a score of 16 or higher indicates the presence of symptomatology associated with clinical depression. Our study found that more than half of the respondents (56.3%) had CES-D scores between 17 and 57. We also found that their CES-D scores were positively correlated with stressors associated with their ability to obtain credit (i.e., financial instability) and government regulations. Imperial County farmers and ranchers perceive unpredictable factors, such as government regulations and policies, weather, and financial instability (e.g., commodity prices), as the most significant stressors related to their farm or ranch operations. These findings correspond with a recent pilot study among farmers and ranchers in the Midwest, which found that 53% of respondents met the criteria for a major depressive disorder, with personal finances and time pressures as the

sources of greatest concern (Rudolphi et al., 2020). Moreover, a systematic review of the literature published between 2000 and 2019 found increased stress, poor physical health, and compromised financial situations as the leading indicators of depression among U.S. farmers (Reed and Claunch, 2020). Given the overall poor health outcomes in Imperial County and the farm-related stressors identified in this study, our findings suggest a concern for suicide risk among Imperial County farmers and ranchers.

Studies have indicated that most people who die by suicide have a mental or emotional disorder, with an estimated 30% to 70% experiencing depression or bipolar disorder (Storm and Storm, 2014). For California adults, it is estimated that one in six (6%) experience a major depressive episode, with a reported male suicide rate of 16.1 per 100,000 during 2011–2013 (CHCF, 2018). This is alarming, given that the reported male suicide rate in farming, forestry, and fishing occupations is almost double the overall male suicide rate for California (Peterson et al., 2020). Understanding how to reduce stress and increase protective factors in medically underserved areas is a pertinent issue for agricultural safety and health efforts.

Studies have addressed the traditional belief that farmers do not like to complain or ask for help (DeArmond et al., 2006; Judd et al., 2006). Given the ambiguity of the respondents' willingness to talk to someone about stress, we also see this reluctance in our findings. Only half of the respondents shared that they were likely or most likely to visit a counselor if they were under severe pressure, and only two answered "yes" to using a service to speak to someone about stress. Personal reluctance and lack of access to mental health services may prompt farmers and ranchers to cope with stressors and depression through more informal means.

Of interest was the perceived role that informal networks play in reducing farm-related stress. This was most pronounced in the respondents' religious involvement, with 62.5% reporting religious service attendance several times a week. High levels of religious involvement may indicate how farmers and ranchers cope with farm-related stress and adverse mental health effects in rural, medically underserved areas. Furthermore, farmers and ranchers may perceive religious coping as less stigmatizing, which can contribute to more positive outcomes for stressful life events and mental health. For example, individuals who use religious coping often experience more stress-related growth, spiritual growth, positive affect, higher self-esteem, and less adverse mental health effects (i.e., depression, anxiety) (Ano and Vasconcelles, 2005). Additionally, the respondents indicated that they relied on family members or spouses to provide information regarding where to seek help. Interestingly, though, they also described their living or home environment as only slightly above "a little supportive" (mean = 2.29). This is concerning, given that a lack of social support has been found to account for increased depression and risk of suicidality among farmers (Judd et al., 2006). On the other hand, studies of agriculture populations have reported that those with higher levels of family and social support were better able to cope with depression (McLaren and Challis, 2009; Stain et al., 2008).

The impacts of COVID-19 will likely compound the farm-related stress already present in farmers' and ranchers' lives. As such, it is critical for farmer associations to support the

mental health of Imperial County farmers and ranchers through collaborative partnerships, such as workshops to increase mental health awareness and access to resources. We specifically hope to see policy changes that support the accessibility, availability, and acceptability of mental health services for farmer association members as a result of this study.

Limitations

The results of this study should be considered carefully. First, the reliability and validity of the survey instrument used in this study cannot be adequately verified. Only selected items from the FSS were used, and the ability to conduct psychometric analysis of the instrument was compromised by the small sample size. Second, our recruitment efforts were altered due to COVID-19 public health orders, which limited us to virtual methods and required us to employ snowballing techniques to increase the responses. These methods likely recruited farmers and ranchers who were comfortable with online activities, thus limiting the respondents to those who had some degree of computer literacy. Additionally, such respondents were likely more willing to share their thoughts about farm-related stress and community support and were more likely to participate than respondents with differing beliefs. Groups within the sample population were not represented equally.

Finally, the results are restricted to Imperial County and are not generalizable; however, the findings may be useful in informing the development of outreach and intervention strategies in similar communities. The limited scope of the study and the small sample size do not allow comparisons between Imperial County and the mental health of farmers elsewhere in California or nationally. Moreover, because the online survey was initially designed for participants to opt in to a key informant interview, and this method was modified due to COVID-19 restrictions, the short-answer questions could have been included in the online survey. As such, the small number of respondents reduced the power of the data.

Future Research

The novel findings from this study provide additional ways to explore and understand farm-related stressors and their impact on mental health. We suggest conducting studies with a larger sample from different California counties and regions. For example, farmers and ranchers in Yuma County, Arizona, or San Diego County, California, may experience different or varying stressors as well as coping strategies despite their similar U.S.-Mexico border location. Given the pronounced role that religion plays in our respondents' lives, further study is needed on how faith-based organizations, as well as other informal networks, can support farmers or ranchers, especially in rural areas that lack mental health resources. Interviews are also needed with informal network stakeholders, such as pastors, 4-H leaders, spouses, and immediate family members, as well as farmworkers, on how farm-related stressors can be addressed in medically underserved areas.

Additionally, this study was conducted during the onset of the COVID-19 pandemic in the U.S., which has likely had significant mental health impacts. For example, in late March 2020, the Kaiser Family Foundation found that seven in ten U.S. residents said that their

lives were disrupted "a lot" or "some" by COVID-19, four in ten adults reported that the crisis had harmed their mental health, and about one in five said it had a "major impact," including about 25% of women, Hispanic adults, and black adults (Kirzinger et al., 2020). While most of the farmers and ranchers in this study are considered to have symptomology associated with clinical depression, based on their CES-D scores, it is essential to assess their depression symptomology in the absence of a global pandemic.

Conclusions

This study describes how farm-related stress can impact the quality of life and mental health of Imperial County farmers and ranchers. Significant stressors were associated with unpredictable factors (e.g., government regulation and policies, weather) that correlated with higher levels of clinical depression symptomology. Additionally, reluctance to use mental health services may be a barrier to seeking help. Support for informal social networks, especially in rural, resource-scarce areas, may help mitigate stressors and improve the health and safety outcomes for Imperial County farmers and ranchers.

Acknowledgements

References

Ano GG, & Vasconcelles EB (2005). Religious coping and psychological adjustment to stress: A meta-analysis. J. Clin. Psychol, 61(4), 461–480. 10.1002/jclp.20049 [PubMed: 15503316]

Butterworth P, Rodgers B, & Windsor TD (2009). Financial hardship, socio-economic position, and depression: Results from the PATH Through Life Survey. Soc. Sci. Med, 69(2), 229–237. 10.1016/j.socscimed.2009.05.008 [PubMed: 19501441]

CHCF. (2018). Mental health in California: For too many, care not there. In California health care almanac. Oakland, CA: California Health Care Foundation.

Cavanaugh M, & Finn P (2020). Imperial County copes with COVID increase (2 July 2020). San Diego, CA: KPBS Public Media. Retrieved from https://www.kpbs.org/podcasts/kpbs-midday-edition-segments/2020/jul/02/imperial-county-copes-covid-increase/

CDC. (2017). Organization of work: Measurement of tools and for research and practice. Atlanta, GA: Centers for Disease Control. Retrieved from https://www.cdc.gov/niosh/topics/workorg/detail092.html

CDC. (2020). California: Key health indicators. Atlanta, GA: Centers for Disease Control. Retrieved from https://www.cdc.gov/nchs/pressroom/states/california/ca.htm

CDFA. (2018). California agricultural production statistics. Sacramento, CA: California Department of Food and Agriculture. Retrieved from https://www.cdfa.ca.gov/statistics/

Chesney E, Goodwin GM, & Fazel Z (2014). Risk of all-cause and suicide mortality in mental disorders: A meta-review. World Psychiatry, 13, 153–160. 10.1002/wps.20128 [PubMed: 24890068]

Cohen J (1988). Statistical power and analysis for the behavioral sciences (2nd Ed.). Hillsdale, NJ: Lawrence Erlbaum.

Cooper SL, Lezotte D, Jacobellis J, & DiGuiseppi C (2006). Does availability of mental health resources prevent recurrent suicidal behavior? An ecological analysis. Suicide Life Threat. Behav, 36(4), 409–417. 10.1521/suli.2006.36.4.409 [PubMed: 16978095]

DeArmond SE, Stallones L, Chen PY, & Sintek EE (2006). Depression and somatic symptoms within the farming community. J. Agric. Saf. Health, 12(1), 5–15. 10.13031/2013.20195 [PubMed: 16536169]

DHHS. (2019). Health Professional Storage Area (HPSA) Find. Washington, DC: Department of Health and Human Services. Retrieved from https://data.hrsa.gov/tools/shortage-area/hpsa-find

Fountoulakis KN, Gonda X, & Rihmer Z (2011). Suicide prevention programs through community intervention. J. Affect. Disorders, 130(1), 10–16. 10.1016/j.jad.2010.06.009 [PubMed: 20599277]

Gregoire A (2002). The mental health of farmers. Occup. Med, 52(8), 471–476. 10.1093/occmed/52.8.471

Hann D, Winter K, & Jacobsen P (1999). Measurement of depressive symptoms in cancer patients: Evaluation of the center for epidemiological studies depression scale (CES-D). J. Psychosom. Res, 46(5), 437–443. 10.1016/S0022-3999(99)00004-5 [PubMed: 10404478]

Imperial County. (2016). Imperial County health status report 2015–2016. El Centro, CA: Imperial County Public Health Department. Retrieved from http://www.icphd.org/medical-provider-resources/reports/health-status-report/

IVEDC. (2019). Imperial Valley: Regional profile and resource opportunities. El Centro, CA:Imperial Valley Economic Development Corporation. Retrieved from http://www.ivedc.com

Judd F, Cooper A-M, Fraser C, & Davis J (2006). Rural suicide: People or place effects? Australian New Zealand J. Psychiatry, 40(3), 208–216. 10.1080/j.1440-614.2006.01776.x [PubMed: 16476147]

Kirzinger A, Kearney A, Hamel L, & Brodie M (2020). KFF health tracking poll - Early April 2020: The impact of coronavirus on life in America. San Francisco, CA: Kaiser Family

Foundation. Retrieved from https://www.kff.org/coronavirus-covid-19/report/kff-health-tracking-poll-early-april-2020/

Klingelschmidt J, Milner A, Khireddine-Medouni I, Witt K, Alexopoulos EC, Toivonen S, LaMontagne A, Chastang J-F, & Niedhammer I (2018). Suicide among agricultural, forestry, and fishery workers: A systematic literature review and meta-analysis. Scandinavian J. Work Environ. Health, 44(1), 3–15. 10.5271/sjweh.3682

Krueger RA, & Casey MA (2009). Focus groups: A practical guide for applied research (4th Ed.). Thousand Oaks, CA: Sage Publications.

Lazarus RS, & Folkman S (1984). Stress, appraisal, and coping. New York, NY: Springer.

Lunner Kolstrup C, Kallioniemi M, Lundqvist P, Kymlinen H-R, Stallones L, & Brumby S (2013). International perspectives on psychosocial working conditions, mental health, and stress of dairy farm operators. J. Agromed, 18(3), 244–255. 10.1080/1059924X.2013.796903

Martin P (2001). Imperial Valley: Agriculture and farm labor. Davis, CA: University of California, Changing Face Project. Retrieved from https://migration.ucdavis.edu/cf/more.php?id=34

McLaren S, & Challis C (2009). Resilience among men farmers: The protective roles of social support and sense of belonging in the depression-suicidal ideation relation. Death Stud., 33(3), 262–276. 10.1080/07481180802671985 [PubMed: 19353822]

Miles MB, & Huberman AM (1994). Qualitative data analysis (2nd Ed.). Thousand Oaks, CA: Sage Publications.

NAP. (2018). Achieving rural health equity and well-being: Proceedings of a workshop. Washington, DC: National Academies Press. Retrieved from https://www.ncbi.nlm.nih.gov/books/NBK531871/

Peterson C, Sussell A, Li J, Schumacher PK, Yeoman K, & Stone DM (2020). Suicide rates by industry and occupation - National violent death reporting system, 32 states, 2016. MMWR, 69(3), 57–62. 10.15585/mmwr.mm6903a1 [PubMed: 31971929]

Radloff LS (1977). The CES-D scale: A self-report depression scale for research in the general population. Appl. Psychol. Meas, 1(3), 385–401. 10.1177/014662167700100306

Reed DB, & Claunch DT (2020). Risk for depressive symptoms and suicide among U.S. primary farmers and family members: A systematic literature review. Workplace Health Saf., 68(5), 236–248. 10.1177/2165079919888940 [PubMed: 31957602]

Rudolphi JM, Berg RL, & Parsaik A (2020). Depression, anxiety, and stress among young farmers and ranchers: A pilot study. Commun. Mental Health J, 56(1), 126–134. 10.1007/s10597-019-00480-y

Scarth RD, Stallones L, Zwerling C, & Burmeister LF (2000). The prevalence of depressive symptoms and risk factors among Iowa and Colorado farmers. American J. Ind. Med, 37(4), 382–389. 10.1002/(SICI)1097-0274(200004)37:4<382::AID-AJIM8>3.0.CO;2-4

Schneiderman N, Ironson G, & Siegel SD (2005). Stress and health: Psychological, behavioral, and biological determinants. Ann. Rev. Clin. Psychol, 1(1), 607–628. 10.1146/annurev.clinpsy.1.102803.144141 [PubMed: 17716101]

Stain HJ, Kelly B, Lewin TJ, Higginbotham N, Beard JR, & Hourihan F (2008). Social networks and mental health among a farming population. Soc. Psychiatry Psych. Epidemiol, 43(10), 843–849. 10.1007/s00127-008-0374-5

Stallones L, Leff M, Garrett C, Criswell L, & Gillan T (1995). Depressive symptoms among Colorado farmers. J. Agric. Saf. Health, 1(1), 37–43. 10.13031/2013.19454

Strom PS, & Strom RD (2014). Adolescents in the internet age: Teaching and learning from them (2nd Ed.). Charlotte, NC: Information Age Publishing.

Thoits PA (1995). Stress, coping, and social support processes: Where are we? What next? J. Health Social Behav., Extra issue: Forty Years of Medical Sociology, 53–79. 10.2307/2626957

Thu K, Lasley P, Whitten P, Lewis M, Donham KJ, Zwerling C, & Scarth R (1997). Stress as a risk factor for agricultural injuries: Comparative data from the Iowa Farm Family Health and Hazard Survey (1994) and the Iowa Farm and Rural Life Poll (1989). J. Agromed, 4(3–4), 181–191. 10.1300/J096v04n03_02
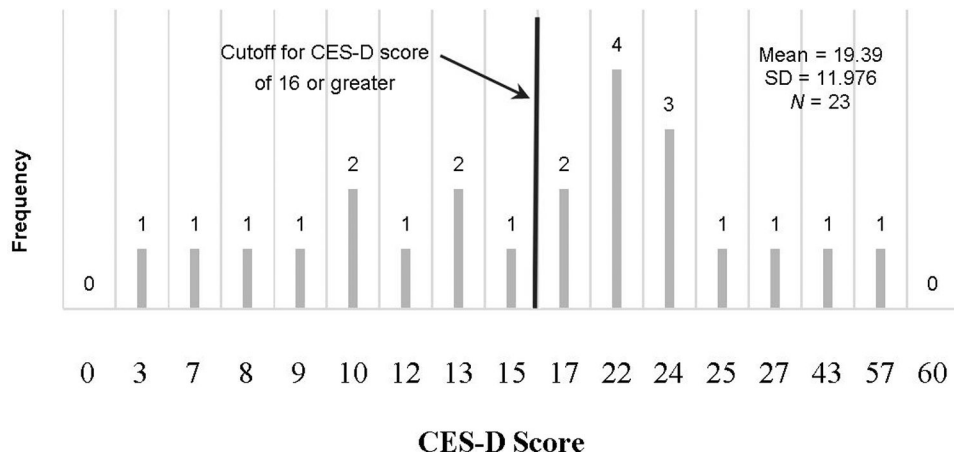
Figure 1.
Relative frequencies of respondents' CES-D scores.

Table 1.

Demographics of a sample of 24 Imperial County farmers or ranchers.

	Characteristic	*n*	%
Gender	Male	20	83
	Female	4	17
Age	Mean (SD)	46.91 (14.6)	-
	Range	23 to 78	-
Marital status	Married	18	75
	Single	5	20
	Widowed	1	5
Type of farm or ranch operation	Dairy	3	12.5
	Field crops	14	58.3
	Other	7	29.1
Role in farm or ranch operation[a]	Owner and operator	13	56.5
	Operates farm but leases it from someone else	1	4.3
	Manager of farm, paid by the owner	3	13.1
	Other	6	26.1
Type of farm or ranch organization[a]	Part of non-family corporation	3	13
	Part of family farm corporation	11	48
	Part of formal partnership with another farmer	1	4
	Part of informal partnership with another farmer	2	9
	Farm totally by myself	6	26
Highest education completed	High school	5	20.8
	Some college	3	12.5
	Two-year degree	2	8.3
	Four-year degree	13	54.2
	Doctorate	1	4.2
Gross income before 2019 taxes	Less than $19,999	1	4.2
	$20,000 to $49,999	6	25
	$50,000 to $99,999	8	33.4
	$100,000 to $249,000	5	20.8
	$250,000 to $499,999	2	8.3
	$500,000 or more	2	8.3

[a]Missing data.

Table 2.

Numbers and percentages of respondents with health concerns.

Health Concern	n	%
Overweight	9	37.5
No health concerns	7	29.2
Sleep problems	4	16.7
Chronic disease (e.g., diabetes, heart disease)	2	8.3
Other[a]	2	8.3

[a] Balding and cancer.

Table 3.

Mean, standard deviation (SD), and skewness for farm-related key stressors.

Variable	Mean	SD	Skewness
Government regulations and policies	3.42	0.717	−1.61
Weather	2.67	0.917	−0.36
Debt load	2.46	1.06	−0.12
Ability to obtain credit	2.21	0.932	−0.09
Young children on the farm or ranch	2.13	1.01	0.292

Table 4.

Intercorrelations, means, and standard deviations (SD) for CES-D scores for key stressors.

Variable	CES-D Score[a]	Mean	SD
Weather	−0.11	2.67	0.917
Ability to obtain credit	0.56[*]	2.21	0.932
Young children on farm or ranch	0.002	2.13	1.01
Debt load	0.19	2.46	1.06
Government regulations and policies	0.45[**]	3.42	0.717

[a] Asterisks indicate significance:

[*] = correlation is significant at the 0.01 level (p = 0.005), and

[**] = correlation is significant at the 0.05 level (p = 0.032).