Predictors of Depressive Symptoms in Rural Farm Women Aged 50 years and Older

Cheryl Dean Witt, PhD, RN [1]

Deborah B. Reed, MSPH, PhD, RN, FAAOHN, FAAN [2]

Mary Kay Rayens, PhD [3]

[1]Assistant Professor, School of Nursing, University of Louisville, cheryl.witt@louisville.edu

[2] Distinguished Service Professor, College of Nursing, University of Kentucky, dbreed01@email.uky.edu

[3] Professor, College of Nursing, University of Kentucky, mkrayens@uky.edu

Abstract

Purpose: Aspects of farming and farm life can contribute to higher levels of depressive symptoms resulting in an increased risk for injury and development of chronic disease and a decrease in overall quality of life. Rural farm women can be subjected to stressors from farming as an occupation, their role within the agrarian culture, and life in a rural area. The purpose of this study was to examine the associations of demographic characteristics, agricultural occupational factors, and health indicators with depressive symptoms among farm women aged 50 years and older.

Methods: Secondary analysis of cross-sectional data from the Sustained Work Indicators of Older Farmers Study (2002-2006) was used to examine the influence of factors on depressive symptoms of older (> 50 years) female farmers (N= 358) from North Carolina and Kentucky. The study was framed by a modified version of the Biopsychosocial Model. Logistic regression was conducted to examine the relationships between demographics, perceived health status, active coping score, perceived stress, and factors specific to farm work and depressive symptoms.

Findings: Participants' depressive symptoms status (high vs. low) was predicted by their race/ethnicity, years of education, adequacy of income for vacation, perceived health status, perceived stress, and active coping.

Conclusion: This study increases our understanding of the factors associated with depressive symptoms in farm women, but also identifies significant gaps in our knowledge of depressive symptoms among this population. The multifaceted dimensions of depressive symptoms revealed indicate a crucial need to more fully explore the interrelationship among the dimensions of the conceptual model and the physical and mental health of farm women. Additional knowledge gained from these studies will assist in the development of assessment instruments, skills, and plan of care specific to the needs of farm women; thus optimizing the health care of farm women.

Keywords: rural women, farm women, depressive symptoms, farm life

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The agricultural industry is a high stress environment with unique aspects of rural life and culture that can contribute to elevated levels of stress and depressive symptoms for farm families. Overall, the agricultural industry ranks 4th among the five major occupational groups with suicide rates higher when compared to other occupations, particularly among production farmers (Burgard & Lin, 2013; Lunner et al., 2013; Peterson, et al., 2020). In addition, higher levels of depressive symptoms can increase an individual's risk of injury and the likelihood of developing chronic disease, all of which can impact overall quality of life (Faragher, Cass, & Cooper, 2005; World Health Organization [WHO], n.d.).

Multiple studies have shown that women are generally at a greater risk of a major depressive disorder than men and have a higher prevalence of depressive symptoms (Angst et al., 2006; Kim, Cho, Hong, & Bae, 2015; Smith, Kyle et al., 2008). This suggests men and women may have

different responses to stressors and/or different causes of higher depressive symptoms. Farm women are subjected to stressors associated with farming as an occupation and potentially further affected by their identity and role within the agrarian culture, adding to increasing their risk of higher depressive symptoms (McShane, Quirk, & Swinbourne, 2016; Pryor, Carruth, & Lacour, 2005).

Stressors of farming include environmental, social, and physical factors. Studies have shown that these stressors include: a) uncertainty of economic future, b) burden of physically demanding work, c) long work hours, and d) aspects beyond the farmer's control such as governmental regulation, climate, insects, and crop disease (Guiney, 2012; Kearney, Rafferty, Hendricks, Allen, & Tutor-Marcum, 2014; WHO, n.d.). Occupational stressors can be further complicated since the farm serves as both the work-place and home, where often family members share the burden of the farm work (Fraser et al., 2005; McShane et al., 2016). Farm women may be subjected to further distress because the culture is one of strong work ethic, conservative views, and adherence to gender roles (Herron & Skinner, 2012; Weller, 2017). The patriarchal structure of the farm family dictates that farm women accept major responsibility for the housework, child care, and community activities (Herron & Skinner, 2012; Price & Evans, 2009; Weller, 2017). This may be in addition to unpaid work on the farm and may include an off-farm job (Thurston, Blundell-Gosselin, & Rose, 2003). The burden of multi-tasking can result in physical and mental stress for farm women, contributing to their risk of having higher depressive symptoms (Price & Evans, 2009; Thurston et al., 2003).

A review of the literature specific to farm women and depressive symptoms revealed multidimensional influences from farm women's social, psychological, biological, environmental, and demographic elements which may increase farm women's risk for higher depressive

symptoms. The leading predictors of higher depressive symptoms included increased family conflict, single marital status, poor health, financial hardship, discrimination, lack of social support, and variables associated with farming as an occupation (i.e., exposure to machinery noise, living on the farm but not actively engaged in farm work, and working on the farm but not getting paid) (Hanklang, Kaewboonchoo, Morioka, & Plernpit, 2016; Rayens & Reed, 2014; Roblyer et al., 2016;Torske, Hilt, Glasscock, Lundqvist, & Krokstad, 2016).

Although the work-family environment of the agrarian culture is intertwined, studies of depressive symptoms among farmers have neglected to investigate the effects of farm life and depressive symptoms among farm women. Current research focuses largely on the male farmer. This is despite the increase of female farmers by 26% between 2012 and 2017 (U. S. Department of Agriculture, National Agricultural Statistics Service, 2019) and the nearly 3.5 million farm women who may be potentially at risk for higher depressive symptoms (Hoppe & Korb, 2013; United States Census Bureau [USCB], 2017).

The lack of current research, the relationship of chronic depressive symptoms with health and quality of life as well as gender differences in depressive symptoms noted in previous research, emphasize the need for further investigation of factors affecting depressive symptoms in farm women.

This study was framed by a modified version of the Biopsychosocial Model (BPSM) developed by Engel (1977). See Figure 1. The BPSM has been applied as a theory in other public health studies related to health behavior (Hildon et al., 2018; Rosenbaum & White, 2016; Smith, Warne, et al., 2015). Similar to the BPSM, variables associated with higher depressive symptoms among farm women were from psychological, social and biological dimensions; however, the

theory was modified to encompass the environmental and specific demographic variables identified from the review of the literature.
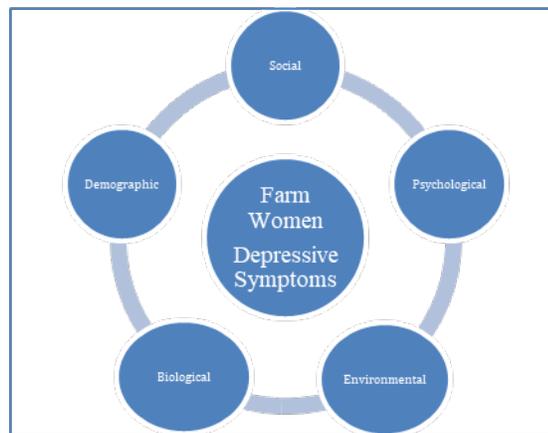

*Figure 1.*BPSM Conceptual Model in Relation to Farm Women and Depressive Symptoms

Objective

The purpose of this study was to explore the association of social, psychological, biological, environmental and demographic characteristics on depressive symptoms among farm women aged 50 years and older.

Methods

Design and Sample

This cross-sectional secondary analysis of data examined the associations of personal characteristics, farm life, and perceived health status with a high level of depressive symptoms in older female farmers residing in rural Kentucky and South Carolina between 2002 and 2006. The original (parent) study was a 4-year descriptive cohort study, Sustained Work Indicators of Older Farmers, and was conducted in Kentucky and South Carolina (Reed, et al., 2008). Data on demographic characteristics, farm work exposure, physical and mental health, and sociocultural aspects of agriculture were collected.

The parent study sample included persons who were primary farmers (the person in charge of the farm's daily operations) and their spouses (N = 1,022). Eligibility for the parent study included: 1) farmer aged 50 or older or spouse of a farmer aged 50 or older enrolled in the study and 2) ability to speak or read English. The participating institutions' Institutional Review Boards approved the study (#99-5536-1P6) prior to data collection. Verbal consent was obtained from each participant at each data collection point. While 1,022 men and women farmers from Kentucky and South Carolina participated in the initial survey, only women who had complete data on all study variables (n = 358) were included in this analysis.

Data were collected via mailed surveys and telephone interviews. Five surveys were timed to capture the seasonal aspects of farming. For these analyses, data were selected from surveys I and II, since survey I included the largest number of demographic questions and survey II included items specific to females. At the completion of each wave, participants received a small monetary award.

Items for the original study were adapted from questions used in the National Institutes of Occupational Safety and Health (NIOSH) sponsored Farm Family Health and Hazard Surveillance Project (FFHHSP) and then used in the Farm Health Interview Survey (FHIS) of the Kentucky Farm Health and Hazard Surveillance Project (Browning, Westneat, Reed, & McKnight, 1999). Additional items from the National Health Interview Survey (NHIS) were used along with other items developed by the investigators of the parent study. Application of the BSPM model separates the influences affecting depressive symptoms of farm women into five dimensions: demographic, psychological, biological, environmental, and social. Based on the review of the literature, items selected from the larger study were those related to ethnicity, age, marital status, income adequacy,

education, social support, active coping, perceived stress, perceived health, number of farm tasks performed, satisfaction from farm work, and number of hours the woman worked on the farm.

Demographic

Demographic characteristics. Assessment of age (in years), race/ethnicity, and education (in years) were obtained by standard survey. The distribution of race and ethnic backgrounds were measured on a nominal scale in the parent study. The composition of the racial and ethnic backgrounds indicated a distribution of four categories: 1) White, non-Hispanic, 2) African American, 3) Hispanic/Latino, and 4) American Indian; this variable was recoded to a binary variable of "White, non-Hispanic" and "non-White" with African American, American Indian, and Hispanic/Latino coded as 1 and White, non-Hispanic as the reference category. Participants were asked four questions related to income adequacy. "How adequate was your household's income to: a) meet household living expenses, b) pay for vacations and leisure activities, c) make major household purchases, and d) allow you to save for retirement?" with scaled response (always, usually, usually not, adequate). These items were also recoded to a binary variable of "always" and "usually adequate" as the reference group.

Psychological

Depressive symptoms. The 20-item Center for Epidemiologic Studies-Depression Scale (CES-D) was used to measure depressive symptoms (Radloff, 1977). The CES-D was developed to quickly measure depressive symptoms; it is one of the best-known and most widely used measures of depressive symptoms. Its reliability and validity have been supported across demographically diverse populations (Radloff, 1977; Vilagut, Forero., Barbaglia, & Alonso, 2016). Participants were asked to report the frequency of their symptoms during the last week on 16 negative and 4 positive items with response options that included 'less than 1 day,' '1-2 days,'

'3-4 days' and '5-7 days.' The items were totaled for a cumulative final score after the four positive items were reverse coded. Next, the scores were divided into two groups based the cut-point of 16 or greater to indicate at least mild to moderate depressive symptoms (Counselling Resource, 2016; Lewinsohn, Seeley, Roberts, & Lee, 1997). Cronbach's alpha for the CES-D in this sample was .88.

Active coping. The 12-item John Henry Active Coping Scale (JHAC-12) was used to measure active coping. It was developed by James and colleagues (James, Hartnett, & Kalsbeek (1983) based on the "John Henryism" effect which hypothesizes that those who face stressors (i.e., low socioeconomic resources, job insecurity, uncertainty of future) for extended periods of time continue to persist in their day-to-day lives despite their situation. The JHAC-12's three major concepts are applicable to the agrarian culture: 1) mental and physical vigor, 2) a strong commitment to hard work, and 3) a single-minded determination to succeed (James, 1994). Responses are scored from 1 (completely false) to 5 (completely true). Examples of questions include: a) "I've always felt I could make of my life pretty much what I wanted to make of it;" and "It's not always easy, but I manage to find a way to do the things I really need to get done." (James, 1994). Scores can range from 12 to 48. The higher the score, the greater the John Henryism, indicating a stronger coping propensity despite undesirable circumstances (James, Harnett, et al., 1983; Wiist & Flack, 1992). The tool was used in a study of African American farmers (*n*=156) in which Cronbach's alpha was .81 (Maciuba, Westneat, & Reed, 2013).Cronbach's alpha in the present sample was .80.

Perceived stress. Perceived stress was measured by an abbreviated 5-item version of the 14-item Perceived Stress Scale (PSS) (Cohen, Kamarck, & Mermelstein, 1983). The questions selected in the original study were those felt to be more closely related to stress within the farm

culture (Rayens & Reed, 2014). Participants were asked to respond (never, almost never, some time, fairly often, very often) to the five questions regarding the frequency of thoughts and feelings over the last month. The three positive items in this version were reversed coded then summed with the other two items so that a higher score indicated a greater level perceived stress. The range of possible scores was from 5 to 25, with greater values for the total score indicating higher overall stress. Cronbach's alpha for this shortened PSS was .75 in this sample.

Biological

Perception of health. Self-reported health was measured in a single item from the National Health Interview Survey: "How would you rate your health in general? Would you say a) Excellent (4), b) very good (3), c) good (2), d) fair (1), or e) poor (0)." Self-rated health was then recoded as "Fair" or better (1) versus "Poor" (0), since these descriptors best delineate the division between better and worse perception of health.

Environmental

Farm tasks. Participants were asked (yes/no) about the types of farm tasks they had completed in the last year. Items reflected a broad range of tasks pertaining to crop production and animal care as well as tasks related to managing the farm. Sample items included in this list included: 'mowed fields,' 'herded animals,' and 'ordered farm supplies.' The total score was the number of "yes" items.

Weekly hours worked. A numerical value was placed in the blank regarding the question, "How many hours did you spend doing farm work last week?" Considering that the standard deviation (12) was larger than the mean (8), emphasizing the right skew of this variable (with many participants working very few hours and relatively few working a much greater number), this was

then coded as a binary variable to reflect those women who did not work any hours on the farm in the past week versus those who spent at least one hour on farm work.

Satisfaction from farm work. Participants were asked, "Overall, how much personal satisfaction do you get from your farm work?" (no satisfaction, very little satisfaction, some satisfaction, a great deal of satisfaction). Given that 87% of the participants in this study chose either the first or second option, this variable was recoded as a binary indicator, with one category comprising those with little to no satisfaction (0) and the other with those with at least some satisfaction (1).

Social

Instrumental support. Participants were queried (yes/no) regarding the availability of someone to assist with the farm work during an emergency.

Data Analysis

Descriptive analysis, including means and standard deviations or frequency distributions was used to characterize the sample and summarized the study variables. Bivariate analysis was used to compare women with lower CES-D scores (<16) to those women who had higher CES-D scores ($\geq$16), including the two-sample *t*-test or chi-square test of association as appropriate. Multivariable binary logistic regression was used to test whether specific demographics, psychological, biological, social, or farm-related environmental factors were associated with higher depressive symptom scores among the farm women. Variance inflation factors were used to assess the presence of multicollinearity and the Hosmer-Lemeshow goodness-of-fit test was used to evaluate model fit. Odds ratios (ORs) and 95% confidence intervals (CI) were calculated for depressive symptoms (< 16 versus $\geq$ 16). Analysis was performed using IBM SPSS, v.22 (IBM Corp., 2013). Alpha was set at .05 for all statistical tests.

Results

The sample demographic characteristics with comparison between the women grouped by low versus high CES-D levels are presented in Table 1. The sample included 358 women whose mean age was 63.7 years (SD = 7.6). Those with high versus low CES-D scores did not differ in mean age. Most of the participants were White, non-Hispanic (83%) and married (92.5%). Their mean education level was 12.5 years (SD = 2.8). Most of the women reported their income as adequate for living expenses (82.7%) and major household purchases (87.7%), but fewer reported an income adequate for a vacation (69%) and even fewer reported an income adequate to save for retirement (59.8%).

Table 1

Group differences for demographic characteristics of the total sample with comparison by low versus high CES-D score among farm women (N = 358)

Variable	Total sample (N = 358)	CES-D Score		
		<16 (*n* = 307)	≥ 16 CES-D (*n* = 51)	
	n (%)	n (%)	*n* (%)	*p*
White/non-Hispanic	296 (82.7%)	260 (87.8%)	36 (12.2%)	.014*
Marital status (married)	331 (92.5%)	284 (85.8%)	47 (14.2%)	.93
Income adequate for living expenses	321 (89.7%)	276 (86.0%)	45 (14.0%)	.717
Income adequate for saving for major household purchases	314 (87.7%)	273 (86.9%)	41 (13.1%)	.086
Income adequate for vacation	248 (69.3%)	226 (91.5%)	21 (8.5%)	.001*
Income adequate for retirement	214 (59.8%)	193 (90.2%)	21 (9.8%)	.003*

Variable	Total sample (N = 358)	CES-D Score
		_____

Further application of the BPSM to include the variables from the biological, psychological, social and environmental categories with comparison between the farm women grouped by low versus high CES-D scores are presented in Table 2. A large percentage of participants reported their overall health as fair to excellent (95%). The majority of women (85%) scored less than 16 on the CES-D and the remainder scoring greater than 16. Overall, perceived stress scores were low. The mean perceived stress score of all participants was 10.7 (SD = 3.7, range 5-24). Scores on active coping were high with a mean of 40.8 (SD = 4.4) on the JHAC-12 scale of 12-48.

Table 2

The modified biopsychosocial characteristics of the total sample of farm women by low versus high CES-D scores (N = 358)

Variable	Total Sample (N = 358) n (%)	CES-D Score		
		CES-D Score < 16 (n = 307) *n* (%)	CES-D Score ≥ 16 (n = 51) *n* (%)	*p*
Biological				
Self-reported health rating of good or better	340 (95.0%)	299 (87.9%)	41(12.1%)	.001*
Psychological				
Perceived stress level	10.7 (3.7)	9.9 (3.2)	15.3 (2.8)	.001*
Active coping level	40.8 (4.4)	41 (4.3)	39.6 (4.7)	.029*
Social				
Instrumental support Has assistance with farm work during emergency	277 (77.4%)	239 (86.3%)	38 (13.7%)	.598
Environmental				
Works on farm	210 (58.7%)	185 (88.1%)	25 (11.5%)	.131

Variable	Total Sample (N = 358)	CES-D Score		
Number of farm tasks over previous year	5.7 (4.5)	5.2 (4.5)	4.8 (4.1)	.495
Satisfaction from farm work	312 (87.2%)	273 (87.5%)	39 (12.5%)	.014*

Note. Significant at the .05 level, *p* < .05

The majority of women had someone to assist with the farm work during an emergency (77.4%). A little over half of the farm women (58.7%) worked on the farm during the previous week and reported a wide variety of weekly hours worked on the farm. The participants reported a range from 0 to 90 hours per week on the farm during the previous week with a mean of 7.4 (SD = 12.1). The number of farm tasks over the past year ranged from 0-20, with a mean of 4.9 (SD = 4.4). The majority of women were satisfied with farm work with 87.2% reporting positively.

Race/ethnicity years of education, adequate income for vacation and retirement, reported health status of fair or better, perceived stress score, active coping score and satisfaction from farm work differed significantly by CES-D level (low vs. high). A Chi-square test for independence (with Yates Continuity Correction) indicated a significant association between race/ethnicity and high CES-D score χ^2 (1, n = 358) = 6.074, p < .001). The percentage of non-White Americans in the high CES-D group was twice as high as the low CES-D group (24% versus 12%). Level of education differed significantly between the groups, with a slightly lower level of education among those in the high CES-D group (mean difference 1.26, 95% CI: .44 to 2.081) and very small effect size. Of those participants in the high CES-D group, only 8.5% reported income adequate for vacation and 9.8% adequate for retirement, compared to 91.5% and 90.2%, respectively of those with low CES-D scores. A small effect size was noted for both income adequate for vacation and retirement.

Those with higher perceived stress scores were more likely to be in the high CES-D group (Table 2) and the effect size was small (mean difference = -5.41, 95% CI: -6.35 to -4.46, eta squared p = .003). The coping level was high and while the difference between the groups was significant, the variance between groups was small (mean difference 1.45, 95% CI: .15 to 2.75, eta squared p =.003). The participants were mostly satisfied with their farm work, but there was a significant difference between groups $\chi2$ (1, n = 358) = 5.0, phi = -.013). The farm women in this study were less likely to be in the high high CES-D group if they had higher levels of adaptive coping or were satisfied with farm work.

Predictors of depressive symptoms

Logistic regression was used to identify predictors of the likelihood of having a high CES-D score (see Table 3). The full model contained 15 independent variables and was significant ($\chi2$ = 142.93, p < .001), indicating that the model distinguished between those farm women who had low versus high CES-D scores. The model as a whole explained between 33% (Cox and Snell R-squared) and 59% (Nagelkerke R-squared) of the variance in CES-D scores and correctly classified 91.1% of cases.

Table 3

Logistic regression to assess predictors of the binary CES-D indicator (N = 358)

Variable	Odds ratio	95% confidence interval for odds ratio
Age	1.0	0.94-1.06
White, non-Hispanic	0.29*	0.10-0.79
Years of education	0.84*	0.71-1.0
Married	1.34	0.27-6.59

Variable	Odds ratio	95% confidence interval for odds ratio
Income adequate for living expenses	4.60	0.84-25.26
Income adequate for major household purchases	0.79	0.19-3.35
Income adequate for vacation	0.15**	0.054-0.44
Income adequate for retirement	2.02	0.76-5.38
Self-reported health level of fair or better	0.96*	0.02-0.45
Perceived stress score	1.81**	1.51-2.16
Active coping score	0.89*	0.81-0.98
Has access to assistance with farm work in an emergency	1.26	0.42-3.81
Worked on the farm in the past week	0.60	0.23-1.60
Number of farm tasks over previous year	1.05	0.94-1.17
Receives satisfaction from farm work	0.60	0.18-2.01

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

Six of the independent variables made a unique statistically significant contribution to the model (race/ethnicity, years of education, income adequacy for vacation, reported health of fair or better, perceived stress score and active coping score). A participant was less likely to have a high level of depressive symptoms if she was White, non-Hispanic and had high levels of education. Women who reported income adequate for vacation were less likely to have high CES-D scores (-1.87, $p \leq .001$). Those respondents who reported health of "fair" or better were less likely to have high CES-D scores, controlling for all other factors in the model (-2.35, $p = .003$). Although the mean active coping score was high overall, the two groups did differ. Those with higher coping

scores were less likely to have high CES-D scores compared to those with low scores (-.11, p = .021). The strongest predictor of a high CES-D score was perceived stress level, with odds of 1.81 ($p \leq$ .001), indicating that farm women who had higher perceived stress were almost twice as likely to have a high CES-D score, controlling for all other factors in the model.

Discussion

In this study several factors significantly predicted a score of 16 or above on the CES-D. Consistent with the literature review and the BPSM model, factors were identified from

specific demographics, biological, and psychological dimensions. No significant factors from either the social or environmental dimensions were noted in this study. This is likely due to having a limited number of questions available from the parent study addressing these areas. Consistent with the literature, race/ethnicity, level of education, factors associated with financial adequacy, self-rated health, perceived stress, and active coping were significant predictors of a high level of depressive symptoms among farm women (Rayens & Reed, 2014; Roblyer et al., 2016; Torske et al., 2016). However, there are several indicators that the overall mental health of farm women is healthy. This suggests the need for further investigation regarding aspects of farm life that may enhance overall mental wellness and protect farm women from a higher level of depressive symptoms.

In this study, race/ethnicity significantly predicted higher depressive symptoms, with twice as many non-White Americans as White, non-Hispanic in the group with high depressive symptoms. Women with high depressive symptoms also had a slightly lower level of education. Results are consistent with those of other studies (Hanklang et al., 2016; Roblyer et al., 2016). Specific demographics (race/ethnicity, education, socioeconomic groups) are commonly noted as predictors of depressive symptoms among women and minorities in the general population not

necessarily living on farms (Becares, Laia, & Jackson, 2014; Marshall, Hooyman, Hill, & Rue, 2013).

The sample in our study was largely White, non-Hispanic but had 17.3% non-White participants, which is a rather large minority subset in farm-based studies. The approximate 500,000 migrant farm women (SAF, 2011) in the U.S. leads to questions regarding specific demographics, lack of U.S. citizenship, and their relationship to depressive symptoms among the subset of migrant farm women; these questions should be further investigated. More studies are needed with both African Americans and migrant farm women to investigate the relationship between demographic variables and depressive symptoms among farm women.

Application of the Biopsychosocial Model includes additional specific demographics associated with depressive symptoms in farm women. Financial adequacy is commonly noted as a variable associated with depressive symptoms; the literature supports this association among farm women (Roblyer et al, 2016; Sanne, Mykletun, Moen, Dahl, & Tell, 2004). Questions of income adequacy focused on living expenses, retirement, major purchases, and vacation. Although income adequacy for vacation and retirement between groups was significant, only income adequacy for vacation was a significant predictor of high a level of depressive symptoms among older farm women. This further supports the findings of Chikani, Reding, Gunderson, and McCarty (2005) study of 1,500 rural women. Their hypothesis that women who take vacations are less likely to become depressed. The psychological and physical benefits of a vacation are well documented; however, studies of farm women regarding this subject are limited (de Bloom et al., 2009; Gump & Matthews, 2000). Despite trends of increasing leisure time among many occupations and increasing emphasis of work-life balance, farming is a demanding occupation with little attention to intentional leisure (Buettner, Shattell, & Reber, 2011; Smit, 2016). Leisure time for farm women

could be problematic as the agrarian culture is one in which many farmers believe leisure time is possible only after all the work is done (Bolwerk, 2002). The survey used in our study did not specify other factors related to the benefits of a vacation or barriers other than financial inadequacy; however, even this limited inquiry predicted higher depressive symptoms in the sample. The subject of leisure time and vacation among farm women is large a gap in the exploration of specific demographics and social factors in the research with farm populations.

Having poor health, higher levels of perceived stress, and lower levels of active coping significantly predicted higher levels of depressive symptoms. While these variables are commonly associated with higher levels of depressive symptoms among farm women within the biological and psychological dimensions of the BPSM (Hovey & Magana, 2002; Rayens & Reed, 2014; Stallones & Beseler, 2002), the farm women in our sample reported overall high levels of active coping, lower levels of perceived stress, and fair to better health. In addition, the majority were largely satisfied with farm work and most had CES-D scores below 16, the standard cutoff for indication of a high level of depression. This suggests that farm women are generally mentally and physically healthy and psychologically secure in their work. This may be a result of "positive affect" effect.

The characteristics of "positive affect" effect include confidence, self-efficacy, physical well-being, effective coping, flexibility, optimism, and pro-social behavior. "Positive affect" is a result of frequent positive moods and possession of skills and resources developed over time resulting in higher adaptive characteristics (Lyubomirsky, King, & Diener, 2005). Rayens and Reed (2014), in their study of 674 older rural couples and predictors of depressive symptoms, suggested a similar term of "healthy worker" effect. Their results reported an overall lower depressive symptom level in their sample. The authors suggest that the healthy worker effect on

the results may be related to many participants in their study who were relatively healthy and actively engaged in farm work, resulting in lower levels of depressive symptoms. The results here are more suggestive of the positive affect effect. While higher numbers of those with lower depressive symptoms reported working on the farm, there is only a slight difference between groups regarding the mean and standard deviation of number of farm tasks over the previous year. However, the majority of women with low CES-D scores did report satisfaction from farm work. Results may have been different had those women who did no farm tasks over the past year had been excluded. The favorable levels noted in this study prompt further questions and thought.

The BPSM model should be applied in future research with farm women to more fully explore the interrelationship among variables and physical and mental health outcomes. The results indicate a need for more robust investigation of farm women's activities and work level, health indicators, quality of life, adaptability, social behavior, and perceived health for a better understanding of those variables on depressive symptoms and other outcomes in farm women.

Several variables identified in the literature were associated with farm women and high depressive symptoms that were not a focus in the original study. The majority of factors were those associated with migrant farm women and a large number of social factors (Hanklang et al., 2016; Pulgar et al., 2016; Roblyer et al., 2016). Applying the BPSM, which includes variables from environmental and social aspects, could have provided a more comprehensive insight to the knowledge of depressive symptoms among older farm women but will provide a basis for opportunities for further investigation.

This study has several limitations. This is a secondary analysis of a dataset not primarily focused on depressive symptoms. The data were collected by cross-sectional design, reflecting only one moment in time in an occupational culture that is highly seasonal. Variables that are more

fluid such as active coping, perceived health, perceived stress, and potentially income, may not be reflective of their effects on depressive symptoms of the farm women over longer periods of time or at times of increased work load. The majority of women in this study were over the age of 50 and married which limits generalizability of results to all farm women. The parent study population purposively sampled from two different geographical areas (North Carolina and Kentucky) and was composed largely of White, non-Hispanic farm couples who may experience different stressors secondary to the type of farming or differences in culture. In addition, the parent study was conducted during a time of greater prosperity for primary farmers. All of these factors make generalizability limited.

Conclusion

Considering the large number of farm women, the increasing number of female farmers, and the changing role of farm women, it is imperative that knowledge be increased about this population, particularly as it relates to the mental health of farm women and their overall quality of life. This secondary analysis revealed the multifaceted dimensions of depression among a cohort of farm women and significant gaps in our knowledge of the BPSM dimensions' and their relationship to the physical and mental health of farm women.

The BPSM should be applied in future research with farm women to more fully explore the interrelationship among variables and physical and mental health outcomes. The results of this study indicate a need for more robust investigation of farm women's activities and work level, health indicators, quality of life, adaptability, social behavior, and perceived health for a better understanding of those variables on depressive symptoms and other outcomes in farm women. Results from in-depth studies can provide crucial information needed for the development of

assessment instruments, assessment skills, and treatment plans specific to farm women; thus, improving the overall health of farm women.

References

Angst, J., Gamma, A., Silverstein, B., Ajdacic-Gross, V., Eich, D., & Rossler, W. (2006). Atypical depressive symptoms in varying definitions. *European Archives of Psychiatry and Clinical Neuroscience, 256*(1), 44-54. https://doi.org/10.1007/s00406-005-0600-z

Becares, L., Laia, N., & Jackson, J. (2014). Ethnic density and depressive symptoms among African Americans: Threshold and differential effects across social and demographic groups. *Public Health*, *104*, 23347-2341. https://dx.doi.org/10.2105%2FAJPH.2014.302047

Bolwerk, C. (2002) The culture of farm work and its implications on health, social relationships and leisure in farm women and men in the United States. *Journal of Cultural Diversity, 9* (4), 102-107.

Browning, S. R., Westneat, S. C., Reed, D. B., & McKnight, R. C. (1999). The Kentucky farm family health and hazard surveillance project (Final Report: Sampling, data analysis, and selected results). Lexington: University of Kentucky, Department of Preventative Medicine, Southeast Center for Agricultural Health and Injury Prevention.

Buettner, L., Shattell, M., & Reber, M. (2011). Working hard to relax: Improving engagement in leisure time activities for a healthier work-life balance. *Issues in Mental Health Nursing, 32*, 269-270. https://doi.org/10.3109/01612840.2011.553346

Burgard, S., & Lin, K. (2013). Bad jobs, bad health? How work and working conditions contribute to health disparities. *The American Behavioral Scientist, 57*, 1105-1127. https://dx.doi.org/10.1177%2F0002764213487347

Chikani, V., Reding, D., Gunderson, P., & McCarty, C. (2005). Vacations improve mental health among rural women: The Wisconsin Rural Women's Health Study. *Wisconsin Medical Journal, 194*(6), 20-23.

Counselling Resource. (2016). Center for Epidemiologic Studies Depression Scale (CES-D): A screening test for depression. Retrieved from https://counsellingresource.com/quizzes/depression-testing/

Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health Social Behavior, 24,* 437-443. http://www.jstor.org/stable/2136404?origin=JSTOR-pdf

de Bloom, J., Kompier, M., Geurtis, S., de Weerth, C., Taris, T., & Sonnentag, S. (2009). Do we recover from vacation? Meta-analysis of vacation effects on health and well-being. *Journal of Occupational Health, 51*(1), 13-25. https://doi.org/10.1539/joh.K8004

Engel, G. (1977) The need for a new medical model: A challenge for biomedicine. *Science, 196,* 129-136.

Faragher, E., Cass, M., & Cooper, C. (2005). The relationship between job satisfaction and health: A meta-analysis. *Occupational and Environmental Medicine, 62*(2), 105-112. https://doi.org/10.1057/9781137310

Fraser, C., Smith, K., Judd, F., Humphreys, J., Frager, L., & Henderson, A. (2005). Farming and mental health problems and mental illness. *International Journal of Social Psychiatry, 51,* 340-349. https://doi.org/10.1177%2F0020764005060844

Green, B., & Johnson, C. (2013). Establishing a theoretical basis for research in musculoskeletal epidemiology: A proposal for the use of the biopsychosocial theory in investigations of back

pain and smoking. *Journal of Chiropractic Humanities, 20*, 1-8. https://doi.org/10.1016/j.echu.2013.10.004

Guiney, R. (2012). Farming suicides during the Victorian drought: 2001-2007. *Australian Journal of Rural Health, 20,* 11-15. https://doi.org/10.1111/j.1440-1584.2011.01244.x

Gump, B., & Matthews, K. (2000). Are vacations good for your health? The 9-year mortality experience after the Multiple Risk Intervention Trials. *Psychosomatic Medicine, 62*, 608-612. https://doi.org/10.1097/00006842-200009000-00003

Hanklang, S., Kaewboonchoo, O., Morioka, I., & Plernpit, S. (2016). Gender differences in depression symptoms among rice farmers in Thailand. *Asia-Pacific Journal of Public Health, 28*(1), 83-93. https://doi.org/10.1177%2F1010539515620631

Herron, R., & Skinner, M. (2012). Farmwomen's emotional geographies of care: A view from rural Ontario. *Gender, Place and Culture, 19*, 232-248. https://doi.org/10.1080/0966369X.2011.572432

Hildon, Z., Tan, C., Shiraz, F., Ng, W., Deng, X., Koh, G. … Vrijhoef, J. (2018). The theoretical and empirical basis of a BioPsychoSocial (BPS) risk screener for detection of older people's health related needs, planning of community programs, and targeted care interventions. *BMC Geriatrics, 18,* 49. https://doi.org/10.1186/s12877-018-0739-x

Hoppe, R., & Korb, P. (2013, April). *Characteristics of women farm operators and their farms. EIB-111*, US Department of Agriculture, Economic Research Service. Retrieved from: https://www.ers.usda.gov/publications/pub-details/?pubid=43750

Hovey, J., & Magana, C. (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, 136*, 493-513. https://doi.org/ 10.1080/00223980209605546

IBM Corp. (2013). IBM SPSS Statistics for Windows, Version 22.0. Armonk, NY: IBM Corp.

James, S., Hartnett, S., & Kalsbeek, W. (1983). John Henryism and blood pressure differences among black men. *Journal of Behavioral Medicine, 6*(3), 259-278.

James, S. (1994). John Henryism and the health of African-Americans. *Culture, Medicine and Psychiatry, 18,* 163-182.

Kearney, G., Rafferty, A., Hendricks, L., Allen, D., & Tutor-Marcum, R. (2014). A cross-sectional study of stressors among farmers in Eastern North Carolina. *North Carolina Medical Journal, 75*, 384-392. https://doi.org/10.18043/ncm.75.6.384

Kim, J., Cho, M., Hong, J., & Bae, J. (2015). Gender differences in depressive symptom profile: Results from nationwide general population surveys in Korea. *Journal of Korean Medical Science, 30*, 1659-1666. https://doi.org/10.3346/jkms.2015.30.11.1659

Lewinsohn, P., Seeley, J., Roberts, R., & Allen, N. (1997). Center for Epidemiological Studies-Depression Scale (CES-D) as a screening instrument for depression among community-residing older adults. *Psychology and Aging, 12*, 277-287. https://psycnet.apa.org/doi/ 10.1037/0882-7974.12.2.277

Lunner, K., Kallioniemi, M., Lundqvist, P., Kymalainen, H., Stallones, L., & Brumby, S. (2013). International perspectives on psychosocial working conditions, mental health, and stress of dairy farm operators. *Journal of Agromedicine, 18*, 244-255. https://doi.org/ 10.1080/1059924X.2013.796903

Lyubomirsky, S., King, L., & Diener, E. (2005). The benefits of frequent positive affect: Does happiness lead to success? *Psychological Bulletin, 131* (6), 803-855. https://psycnet.apa.org/doi/10.1037/0033-2909.131.6.803

Maciuba, S., Westnest, S., & Reed, D. (2013). Active coping, personal satisfaction, and attachment to land in older African-American farmers. *Issues in Mental health Nursing, 34*, 335-343. https://doi.org/10.3109/01612840.2012.753560

Marshall, G., Hooyman, N., Hill, K., & Rue, T. (2013). Association of socio-demographic factors and parental education with depressive symptoms among older African Americans and Caribbean Blacks. *Aging and Mental Health, 17*, 732-737. https://doi.org/10.1080/13607863.2013.777394

McShane, C., Quirk, F., & Swinbourne, A. (2016). Development and validation of a work stressor scale for Australian farming families. *Australian Journal of Rural Health, 24*, 238-245. https://doi.org/10.1111/ajr.12261

Peterson, C., Sussell, A., Li, J., Schumacher, P., Yeoman, K., & Stone, D. (2020). Suicide rates by industry and occupation – National Violent Death Reporting System, 32 states, 2016. *Morbidity and Mortality Weekly Report, 65*, 57-62. http://dx.doi.org/10.15585/mmwr.mm6903a1

Price, L., & Evans, N. (2009). From stress to distress: Conceptualizing the British family farming patriarchal way of life. *Journal of Rural Studies, 25*(1), 1-11. https://doi.org/10.1016/j.jrurstud.2008.03.008

Pryor, S., Carruth, A., & Lacour, G. (2005). Occupational risky business: Injury prevention behaviors of farm women and children. *Issues in Comprehensive Pediatric Nursing, 28*(1), 17-31. https://doi.org/10.1080/01460860590916744

Pulgar, C., Grisel, T., Suerken, C., Ip, E., Arcury, T., & Quandt, S. (2016). Economic hardship and depression among women in Latino farmworker families. *Journal of Immigrant and Minority Health, 18*, 497-504.

Radloff, L. (1977). The CES-D scale: A self-report depression scale for research in the general population. *Applied Psychological Measurements, 1,* 385-401. https://doi.org/10.1177%2 F014662167700100306

Rayens, M., & Reed, D. (2014). Predictors of depressive symptoms in older rural couples: The impact of work, stress and health. *The Journal of Rural Health, 30,* 59-68. https://doi.org/10.1111/jrh.12028

Reed, D., Rayens, M., Garkovich, L., Browning, S., McCulloch, J., Turner, W., … Fields, B. (2008). Sustained work indicators of older farmers. Final report. Published under NIOSH grant 1RO1 OH04157. Lexington, KY: University of Kentucky College of Nursing.

Roberts, R., & Lee, E. (1993). Occupation and the prevalence of major depression, alcohol, and drug abuse in the United States. *Environmental Research, 61*(2), 266-278. https://doi.org/10.1006/enrs.1993.1071

Roblyer, M., Grzywacz, J., Suerken, C., Trejo, G., Ip, E., Arcury, T., & Quandt, S. (2016). Interpersonal and social correlates of depressive symptoms among Latinas in farmworker families living in North Carolina. *Women and Health, 56*(2), 177-193. https://doi.org/10.1080/03630242.2015.1086464

Rosenbaum, D., & White, K. (2016). Understanding the complexity of biopsychosocial factors in the public health epidemic of overweight and obesity. *Health Psychology Open, 3*(1), 1-4. https://doi.org/10.1177%2F2055102916634364

Sanne, B., Mykletun, A., Moen, B., Dahl, A., & Tell, G. (2004). Farmers are at risk for anxiety and depression: The Hordaland health study. *Occupational Medicine, 54*(2), 92-100. https://doi.org/10.1093/occmed/kqh007

Smit, B. (2016). Successfully leaving work at work: The self-regulatory underpinnings of psychological detachment. *Journal of Occupational & Organizational Psychology, 89,* 493-514. https://doi.org/10.1111/joop.12137

Smith, D., Kyle, S., Forty, L., Cooper, C., Walters, J., Russell, E., … Jones, I. (2008). Differences in depressive symptom profile between males and females. *Journal of Affective Disorders, 108*, 279-284. https://doi.org/10.1016/j.jad.2007.10.001

Smith, M., Warne, R., Barry, A., Rossheim, M., Boyd, M., & McKyer, E. (2015). A biopsychosocial examination of ATOD use among middle and high school students. *American Journal of Health Behavior, 39*, 799-808. https://doi.org/10.5993/AJHB.39.6.8

Stallones, L., & Beseler, C. (2002). Pesticide poisoning and depressive symptoms among farm residents. *Annals of Epidemiology, 12*(6), 389-394. https://doi.org/10.1016/S1047-2797(01)00298-8

Thurston, W., Blundell-Gosselin, H., & Rose, S. (2003). Stress in male and female farmers: An ecological rather than an individual problem. *Canadian Journal of Rural Medicine, 8*, 247-254.

Torske, M., Hilt, B., Glasscock, D., Lundqvist, P., & Krokstad, S. (2016). Anxiety and depression symptoms among farmers: The HUNT Study, Norway. *Journal of Agromedicine, 21*(1), 24-33. https://doi.org/10.1080/1059924X.2015.1106375

United States Census Bureau (USCB). (2017). Unmarried and single Americans Week: Sept. 17-23, 2017. Retrieved from https://www.census.gov/newsroom/facts-for-features/2017/single-americans-week.html

U. S. Department of Agriculture, National Agricultural Statistics Service. (2019). 2017 *Census of agriculture highlights*. Retrieved from https://www.nass.usda.gov/Publications/Highlights/2019/2017Census_Farm_Producers.pdf

Vilagut, G., Forero., C., Barbaglia, G., & Alonso, J. (2016) Screening for depression in the general population with the Center for Epidemiologic Studies Depression (CES-D): A systematic review with meta-analysis. *PloS one, 11* (5). https://doi.org/10.1371/journal.pone.0155431

Weller, G. (2017). Caring for the Amish: What every anesthesiologist should know. *Anesthesia and Analgesia, 124*, 1520-1528. https://doi.org/10.1213/ANE.0000000000001808

Wiist, W., & Flack, J. (1992). A test of the John Henryism hypothesis: Cholesterol and blood pressure. *Journal of Behavioral Medicine, 15*(1), 15-29.

World Health Organization (WHO). (n.d.). Suicide. Retrieved from http://www.who.int/mental_health/suicide-prevention/en/