Depressive Symptoms of Latinx Women in Rural Farmworker and Urban Non-Farmworker Families in North Carolina

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Abstract

Background Mental health among low-income Latinx women in the United States (US), including those in farmworker families, is a health equity concern. This analysis (1) describes the depressive symptoms among Latinx women in rural farmworker families and urban non-farmworker families and (2) delineates immigration and acculturation, family composition and disruption, and financial characteristics associated with depressive symptoms experienced by these women.
Methods Data are from a 2019–2020 cross-sectional survey of 66 rural farmworker and 52 urban non-farmworker women with a child participating in a study of pesticide exposure and neurocognitive development. Depressive symptoms were measured with the CES-D Short Form.
Results The median (25th–75th percentiles) depressive symptom score reported was 2.0 (1.0–4.0), with 10 (8.5%) women having depressive symptom scores of 10 or greater. In bivariate analysis, among immigration and acculturation characteristics, women born in the USA and who spoke English fluently had lower depressive symptom scores. Among family composition and disruption characteristics, married women, and those with two adults in the household had lower depressive symptom scores. No financial status characteristic had statistically significant associations with depressive symptom score. In multivariate analysis, rural farmworker women had an expected median score one point lower than did urban non-farmworker women.
Conclusion Addressing mental health among immigrant women, particularly those in farmworker families, is a complex undertaking. Rural versus urban locality provides a context for mental health. Determining the proximal determinants of locality requires further analysis.

Keywords Women's health · Health equity · Mental health · Rural health · Occupational health

Introduction

The mental health of low-income and working class Latinx in the United States (US) is an ongoing health equity concern [1]. This concern is especially pertinent for Latinx farmworker family members who must deal with significant situational and structural stressors [2]. Situational stressors include family separation, family responsibility, social marginalization, poor housing conditions, poor work conditions and substantial work demands, and poor physical health [2]. An additional situational stressor for women in farmworker communities is sexual harassment and abuse [3–5]. Structural stressors include discrimination, acculturation, documentation status, poverty, and limited access to health care [2].

Latinx farmworker mental health research has examined a limited set of issues, including stress [6–8], anxiety [9, 10], and alcohol use disorder [11–13], as well as depression [7, 14–17]. The prevalence of elevated depressive symptoms reported for Latinx migrant and seasonal farmworkers is highly variable, ranging from 6% to 45% [2]. This variability results in part from differences in instruments and differences in definitions for identifying cases. Although

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women constitute one third of Latinx migrant and seasonal farmworkers and women not employed in agriculture are often present in farmworker families, little farmworker mental health research has specifically considered women farmworkers or women in farmworker families [2, 18]. This is particularly the case for depression and depressive symptoms.

Fortunately, analyses of depressive symptoms among women employed as farmworkers women and those in farmworker families (families in which at least one member is employed as a migrant or seasonal farmworker) have generally used the same measure of depressive symptoms, the short version of the Center for Epidemiological Studies–Depression Scale (CES-D) [19]. Scores for this ten-item scale can range from 0 to 30, with a score of 10 or higher indicating elevated depressive symptoms. The one analysis of depressive symptoms among women employed as farmworkers found that their mean depressive symptom score was 6.1 (Standard Deviation (SD) 4.8) [12].

A set of analyses focused on Latinx women in farmworker families who had at least one child (about one third of whom were employed as farmworkers, about one third were not employed outside the home, and about one third were employed in other industries) found, depending on the inclusion criteria for the specific analysis, that they had a mean depressive symptoms score of 5.9 (SD 4.5) [19] to 7.2 (SD 5.6) [21]. Thirty-one percent of these women had a score of 10 or greater, indicating elevated depressive symptoms [21, 22]. Longitudinal analysis documenting depressive symptoms among Latinx women in farmworker families indicates that depressive symptoms are variable [23]; women did not experience elevated depressive symptom scores for about two thirds of eight points over a 2-year period, yet about two thirds of these women reported elevated depressive symptom scores at least once during this period.

These studies point to three sets of factors that should be considered in understanding depressive symptoms among women employed as farmworkers and women in farmworker families. The first set is immigration and acculturation. Being a migrant farmworker is associated with an increased risk for greater depressive symptoms among women employed as seasonal farmworkers [20]. The second set is family composition and disruption. Family disruption (measured with the item "we fight a lot in our family") is associated with greater depressive symptoms among Latinx women in farmworker families [21]. The third set is financial status. Similar to women in other studies [24, 25], financial problems, such as economic insecurity, are related to greater depressive symptoms among Latinx women in farmworker families [21, 22]. Specific occupation (farm work versus operative or domestic worker) is not associated with depressive symptoms among women in farmworker families [12, 20]. However, several work organization characteristics,

including nonstandard shift, psychological demand, and lack of skill variety, are marginally associated with increased depressive symptoms [20].

A few investigations compare the mental health of women in farmworker families to that of Latinx urban women. Analyses in North Carolina report that Latinx urban women have levels of depressive symptoms similar to those reported for women in farmworker families; for example, Latinx women working in poultry processing plants and those working in other manual jobs had a mean depressive symptom score of 6.2 based on the short version of the CES-D [26]. Direct comparison of Latinx women employed as farmworkers with Latinx women employed in other occupations and unemployed Latinx women not in farmworker families found that depressive symptoms, although high, did not differ significantly by occupation and employment [12. As with Latinx women employed as farmworkers [20], among Latinx women employed in non-agricultural manual jobs, such job characteristics as awkward position, skill variety, and psychological demands were associated with greater depressive symptoms [26].

This analysis uses data for low-income Latinx women in North Carolina with at least one child to addresses two aims. The first aim is to describe the level of depressive symptoms among Latinx women in rural farmworker families as compared to urban non-farmworker families. The second aim is to delineate the immigration and acculturation, family composition and disruption, and financial characteristics associated with depressive symptoms experienced by these women.

Methods

This analysis uses data collected as part of the Preventing Agricultural Pesticide Exposure 5 (PACE5) study, a community-based participatory research collaboration between Wake Forest School of Medicine and the North Carolina Farmworkers Project (Benson, NC; http://ncfwp.org/.). PACE5 is a large, two-group, prospective study examining the health and cognitive effects of pesticide exposure for Latinx children in farmworker and non-farmworker families. The study's comparative design includes a sample of children in rural, Latinx farmworker families and a sample of children in similar urban, Latinx families with no members employed as farmworkers. The Wake Forest School of Medicine Institutional Review Board approved the PACE5 study protocol, and the study received a Certificate of Confidentiality from the National Institutes of Health.

Participants

Participants in this analysis are the mothers of children recruited to the PACE5 study. Inclusion criteria for the

children were age 8 years at baseline and completed the first grade in a US school. Inclusion criteria for the families were that they self-identified as Latinx and had family incomes below 200% of the federal poverty level. For the rural families, the mother or her cohabiting partner had to be employed in farm work on non-organic farms during the past three years. For the urban families, all adults living in the household could not have been employed in an industry with routine exposure to pesticides (e.g., farm work, landscaping, or pest control) in the previous three years. The urban families also could not have lived adjacent to agricultural fields in the previous three years. Families were excluded from the study if their child had a life-threatening illness, prior history of neurological conditions, physical condition, or development disorder that would not allow them to complete or would interfere with the results of neurobehavioral tests or brain imaging (used in the main study). Families were also excluded if a primary language other than Spanish or English was spoken in the home or the mother refused to complete the questionnaires.

Participants were recruited over the period March 2018 to December 2019. Participants provided data at baseline and at quarterly follow-ups. Eight quarterly follow-ups were planned to be completed over 2 years, but the follow-up schedule was extended due to interruptions caused by the COVID-19 pandemic. Rural families were recruited in eastern North Carolina counties with large farmworker populations. Urban families were recruited in central North Carolina from Winston-Salem and the surrounding urban counties. For both samples, bilingual research staff contacted parents and explained the overall study procedures, answered questions, and, if the parent agreed to participate, obtained signed informed consent from the parent and assent from the child. The sample for this analysis includes 118 mothers (66 women in rural farmworker families and 52 women in urban non-farmworker families) who completed the CES-D scale in the first quarterly follow-up (completed between July 2019 and March 2020, before data collection was suspended due to the pandemic). Because interviewers worked through community partners, the number of potential participants or their parents who refused to participate is not known.

Data

Data include those collected in a baseline life history calendar [27] and questionnaire, and in the first quarterly follow-up questionnaire. The calendar and questionnaires were interviewer administered. A parent, usually the mother, completed the calendar and the two questionnaires. The life history calendars collected information on participants' environmental exposures from conception to date of the interview using an open-ended format [27]. The baseline questionnaire included items about the child's and family's demographic and background characteristics. The follow-up questionnaire included the 10-item, short-form version of the CES-D [19]. Spanish-language items and scales were adapted from existing questionnaires when available. New items were developed in English, translated into Spanish by a native Spanish speaker, and back translated into English by a native English speaker.

Interviewers were native Spanish speakers; all spoke English, but with varying degrees of proficiency. They completed training before data collection began. The interviewers entered data in real time during the interviews using Research Electronic Data Capture (REDCap), hosted at Wake Forest School of Medicine through the Clinical and Translational Science Institute. The REDCap system provides secure, web-based applications for a variety of types of research [28]. Participants were given a $20 cash incentive for completing the baseline questionnaire and calendar and a $20 cash incentive for completing the quarterly follow-up questionnaire.

Measures

Depressive symptoms are measured with a validated Spanish version of the CES-D Short Form (CES-D-10) [19, 29]. Participants rank 10 experiences for the past week on a 4-point scale of zero (rarely or none of the time) to three (most or all of the time). Scores can range from zero to 30. The scale's Cronbach's alpha for this study is 0.84. In addition to their total score, participants are also placed into two categories: those with a score of 10 or higher are considered to have elevated depressive symptoms and those with a score lower than 10 do not have elevated depressive symptoms [30].

Independent variables include measures of personal, immigration and acculturation, family composition and disruption, and financial characteristics. Personal characteristic measures are locality in the categories of rural farmworker and urban non-farmworker and age in the categories of 21–29 years, 30–34 years, 35–39 years, and 40–45 years. Immigration and acculturation measures are place of birth in the categories Mexico, other Latin America (including Guatemala, Honduras, El Salvador, Dominican Republic, Venezuela), and the USA (including Puerto Rico); fluent in English (dichotomous); and educational attainment in the categories 11 or fewer years versus 12 or more years.

Marital status is the first measure of family composition and disruption; it has the values of married or living as married versus not currently married. Spouse always present in the household is dichotomous. Number of adults in the household has the values of one, two, and three or more. Number of children in the household has the values of one or two, three, and four or more. Whether the family had

experienced a deportation is dichotomous. Number of residential moves in the last 8 years has the values of none, one, two, and three or more.

Among financial status measures, occupation is in the dichotomous categories does not work outside the home and employed outside the home; among those employed outside the home, the number working in major occupation groups are reported. Occupational groups include farm work, production operative (assembly line manufacturing worker), cleaning and maintenance, and other. Food security in the categories of high versus other (marginal, low, very low) is measured with the Spanish-language adaptation [31] of the US Household Food Security Survey Module [32]. Financial hardship in the past 8 years in the categories often, rarely, and never is measured with an item from an adverse childhood experiences inventory [33].

Statistical Analysis

Descriptive statistics (counts, percentages or median, 25th–75th percentile as appropriate) were calculated overall and by farmworker status for the participant characteristics of interest as well as the depressive symptom scores. Associations between these variables and farmworker status were tested using Chi-Square, Fisher's Exact, or Kruskal–Wallis tests as appropriate.

The depressive symptom score was highly skewed in this sample. Therefore, it was further summarized within participant characteristics by calculating the median (25th–75th percentile), and Kruskal–Wallis tests were used for bivariate associations. Finally, to examine the relationship between median depressive symptom scores and selected measures from personal, immigration and acculturation, family composition and disruption, and financial characteristics, a multivariable model was created. Covariates for the model were selected based on the lowest p value within a category from the bivariate associations, and a multivariate quantile linear regression for median was employed where standard errors were found from resampling with 5000 bootstrap replications. p values less than 0.05 were considered statistically significant.

Results

Personal Characteristics

The women were aged 24 through 45 years, with most aged 30–34 years (31.4%) and 35–39 years (28.8%) (Table 1). Most were born in Mexico (78.0%). Fewer than one-in-five were fluent in English, with significantly fewer rural (10.6%) than urban (28.8%) women being fluent English speakers. About one quarter had 12 or more years of education, with significantly fewer rural (18.2%) than urban (38.5%) women

having completed high school. Most were married (85.6%), with their spouse always being present (77.9%). The rural and urban women were similar in the number of adults and children in their households, with most (74.6%) living in households with two adults. Few of the women had experienced a deportation in their family. About one quarter of the women had experienced 3 or more residential moves, with this percent being significantly lower among rural (14.1%) than urban (42.9%) women. About one third (30.5%) stated that they did not work outside the home, with this percent being greater for urban (48.1%) compared to rural (16.7%) women. The employed women worked largely in the manual occupations farm work, production operative, and cleaning and maintenance. A plurality (40.7%) reported high food security; however, among those who did not report high food security, 39.0% reported low and 3.4% reported very low food security. One third reported often having a financial hardship.

Depressive Symptoms

The CES-D scores were highly skewed with 27 (22.9%) zeros. The mean (SD) was 3.5 (4.4). The median depressive symptom score reported was 2.0 (1.0–4.0), with 10 (8.5%) women having depressive symptom scores of 10 or greater (Table 2). The rural and urban women did not significantly differ in median depressive symptom scores or the number with scores of 10 or greater.

The women did not significantly differ in depressive symptom scores by age (Table 3). The women did significantly differ in depressive symptom scores in terms of several immigration and acculturation characteristics. Women born in the USA had lower median scores (0.5) than did those born in Mexico (2.0) or in other Latin American countries (3.0). Those who spoke English fluently had lower scores than those who did not (1.5 versus 2.0). Women differed in depressive symptom scores in terms of several family composition and disruption characteristics. Married women had significantly lower scores than did those who were not currently married (2.0 versus 4.0). Women living in households with only two adults had significantly lower scores (2.0) than did those living in households with one adult (5.0) or more than two adults (4.0). Those women reporting that a spouse was always present in the family reported lower scores than did those indicating a spouse was not always present (2.0 versus 3.0), and those not experiencing a deportation in the family reported lower scores those who did (2.0 versus 4.0). These last two associations only approached statistical significance. None of the financial status characteristics had statistically significant associations with the depressive symptom scores.

The multivariate analysis of depressive symptom scores included locality (rural farmworker versus urban

Table 1 Participant personal, immigration and acculturation, family composition and disruption, and financial characteristics for Latinx women in rural farmworker and urban non-farmworker families, North Carolina, 2018–2019

Participant personal, immigration and acculturation, family composition and disruption, and financial characteristics	All participants $n=118$ n (%)	Rural farmworker $n=66$ n (%)	Urban non-farm-worker $n=52$ n (%)	p
Personal				
Age (in years)				0.07
21–29	23 (19.5)	12 (18.2)	11 (21.2)	
30–34	37 (31.4)	27 (40.9)	10 (19.2)	
35–39	34 (28.8)	17 (25.8)	17 (32.7)	
40–45	24 (20.3)	10 (15.2)	14 (26.9)	
Immigration and acculturation				
Place of Birth				0.60
Mexico	92 (78.0)	53 (80.3)	39 (75.0)	
Other Latin America	18 (15.2)	10 (15.2)	8 (15.4)	
USA	8 (6.8)	3 (4.5)	5 (9.6)	
Fluent in English				0.01
No	96 (81.4)	59 (89.4)	37 (71.2)	
Yes	22 (18.6)	7 (10.6)	15 (28.8)	
Educational attainment				0.01
11 years or fewer years	86 (72.9)	54 (81.8)	32 (61.5)	
12 or more years	32 (27.1)	12 (18.2)	20 (38.5)	
Family composition and disruption				
Marital status				0.43
Married/living as married	101 (85.6)	55 (83.3)	46 (88.5)	
Not married	17 (14.4)	11 (16.7)	6 (11.5)	
Spouse always present in family[1]				0.94
No	25 (22.1)	14 (21.9)	11 (22.5)	
Yes	88 (77.9)	50 (78.1)	38 (77.5)	
Number of adults in household				0.07
1	14 (11.9)	10 (15.2)	4 (7.7)	
2	88 (74.6)	51 (77.3)	37 (71.2)	
3 or more	16 (13.6)	5 (7.6)	11 (21.1)	
Number of children in household[2]				0.90
1 or 2	42 (35.9)	23 (34.9)	19 (37.3)	
3	37 (31.6)	22 (33.3)	15 (29.4)	
4 or more	38 (32.5)	21 (31.8)	17 (33.3)	
Deportation in family				0.50
No	109 (92.4)	62 (93.9)	47 (90.4)	
Yes	9 (7.6)	4 (6.1)	5 (9.6)	
Number of residential moves[2]				<0.01
0	27 (23.9)	18 (28.1)	9 (18.4)	
1	34 (30.1)	26 (40.6)	8 (16.3)	
2	22 (19.5)	11 (17.2)	11 (22.4)	
3 or more	30 (26.5)	9 (14.1)	21 (42.9)	
Financial status				
Occupation				<0.01
Does not work outside the home	36 (30.5)	11 (16.7)	25 (48.1)	
Employed outside the home	82 (69.5)	55 (83.3)	27 (51.9)	
Farm work	31 (26.3)	31 (47.0)	0 (0.0)	
Production operative	18 (15.3)	10 (15.2)	8 (15.4)	

Table 1 (continued)

Participant personal, immigration and acculturation, family composition and disruption, and financial characteristics	All participants $n=118$ n (%)	Rural farmworker $n=66$ n (%)	Urban non-farmworker $n=52$ n (%)	p
Cleaning and Maintenance	11 (9.3)	6 (9.1)	5 (9.6)	
Other	22 (18.6)	8 (12.1)	14 (26.9)	
Food security				0.42
High	48 (40.7)	29 (43.9)	19 (36.5)	
Other (Marginal, Low, Very low)	70 (59.3)	37 (56.1)	33 (63.5)	
Marginal	20 (16.9)	9 (13.6)	11 (21.2)	
Low	46 (39.0)	28 (42.4)	18 (34.6)	
Very low	4 (3.4)	0 (0.0)	4 (7.7)	
Financial hardship				0.45
Often	40 (33.9)	25 (37.9)	15 (28.8)	
Rarely	56 (47.5)	28 (42.4)	28 (53.9)	
Never	22 (18.6)	13 (19.7)	9 (17.3)	

[1] $n=113$
[2] $n=117$

non-farmworker), as well as measures for each of the three sets of factors. The three immigration and acculturation measures were correlated. The one with the smallest p value in the bivariate analysis, fluent in English, was included in the multivariate model. Three significant and near significant family composition and disruption measures, marital status, spouse always present in family, and number of adults in family were correlated. The one with the smallest p value in the bivariate analysis, marital status, was included in the multivariate model. The measure deportation in family was also included in the multivariate model because it had a near significant association in the bivariate analysis. None of the three financial status measure had a significant association with depressive symptom score in the bivariate analysis. The one with the smallest p value, financial hardship, was included in the multivariate model.

Although not having a statistically significant association in the bivariate analysis, locality did have a significant association with depressive symptom score in the multivariate analysis (Table 4). Rural farmworker women had an expected median score one point lower than did urban non-farmworker women. In addition, women not fluent in English had an expected median score one point greater than those fluent in English, although only approaching statistical significance (p=0.06). Similarly, unmarried women had an expected score two points greater than married women, although only approaching statistical significance (p=0.06).

Discussion

The depressive symptom scores for the Latinx women in farmworker families and in non-farmworker families are low compared to other research [12, 20–23]. Although these scores are low, depressive symptoms were still common among these women, with 8.5% having sufficient scores to be considered elevated depressive symptoms. This is similar to the 8.1% of US adults whom meet criteria for depression [34]. Okonji and colleagues [35] conclude that immigrants have lower odds of having depression than do US citizens.

Table 2 Depressive symptom scores for Latinx women in rural farmworker and urban non-farmworker families, North Carolina, 2018–2019

Depressive symptom scores	All participants $n=118$	Rural, farmworker $n=66$	Urban, non-farmworker $n=52$	p value
Median depressive symptom scores (25th–75th percentile)	2.0 (1.0–4.0)	2.0 (1.0–3.0)	2.5 (1.0–6.0)	0.27
Number (%) with a depressive symptom score of 10 or greater				0.33
Fewer than 10	108 (91.5)	62 (93.9)	46 (88.5)	
10 or greater	10 (8.5)	4 (6.1)	6 (11.5)	

Table 3 Bivariate associations of participant personal, immigration and acculturation, family composition and disruption, and financial characteristics with depressive symptom scores for Latinx women in rural farmworker and urban von-farmworker families, North Carolina, 2018–2019 ($N = 118$)

Participant personal, immigration and acculturation, family composition and disruption, and financial characteristics	Median depressive symptom scores (25th–75th percentile)	p value
Personal characteristics		
Age (in years)		0.28
21–29	2.0 (0.0–3.0)	
30–34	2.0 (1.0–4.0)	
35–39	2.0 (1.0–3.0)	
40–45	3.0 (1.5–6.0)	
Immigration and acculturation		
Place of birth		0.02
Mexico	2.0 (1.0–4.0)	
Other Latin America	3.0 (1.0–6.0)	
USA	0.5 (0.0–2.0)	
Fluent in English		0.02
No	2.0 (1.0–5.5)	
Yes	1.5 (0.0–2.0)	
Educational attainment		0.10
11 years or fewer	2.0 (1.0–5.0)	
12 or more years	1.5 (0.0–3.0)	
Family composition and disruption		
Marital status		<0.01
Married/living as married	2.0 (0.0–3.0)	
Not married	4.0 (3.0–7.0)	
Spouse always present in family[1]		0.08
No	3.0 (2.0–7.0)	
Yes	2.0 (1.0–3.5)	
Number of adults In household		<0.01
1	5.0 (3.0–8.0)	
2	2.0 (0.0–3.0)	
3 or more	4.0 (0.5–5.5)	
Number of children in household[2]		0.58
1 or 2	2.0 (0.0–5.0)	
3	2.0 (1.0–3.0)	
4 or more	3.0 (1.0–5.0)	
Deportation in family		0.07
No	2.0 (1.0–4.0)	
Yes	4.0 (2.0–7.0)	
Number of residential moves[2]		0.88
0	2.0 (1.0–5.0)	
1	2.0 (1.0–3.0)	
2	2.0 (1.0–3.0)	
3 or more	2.5 (1.0–7.0)	
Financial status		
Occupation		0.68
Does not work outside the home	2.0 (1.0–6.0)	
Employed outside the home	2.0 (1.0–3.0)	
Food security		0.16
High	2.0 (1.0–3.0)	
Other (marginal, low, very low)	2.0 (1.0–5.0)	
Financial hardship		0.13
Often	3.0 (2.0–5.5)	
Rarely	2.0 (1.0–5.0)	
Never	1.0 (0.0–3.0)	

[1] $n = 113$
[2] $n = 117$

Table 4 Multivariate associations of participant personal, immigration and acculturation, family composition and disruption, and financial characteristics with depressive symptom scores for Latinx women in rural farmworker and urban non-farmworker families, North Carolina, 2018–2019 ($N = 118$)

Participant personal, immigration and acculturation, family composition and disruption, and financial characteristics	Estimate	Standard error	95% Confidence limits	p value
Rural farmworker vs urban non-farmworker	− 1.000	0.493	− 1.977, − 0.023	0.04
Not fluent vs fluent in English	1.000	0.543	− 0.075, 2.075	0.06
Not married vs married	2.000	1.057	− 0.094, 4.094	0.06
Deportation vs no deportation in family	1.000	2.029	− 3.021, 5.021	0.62
Financial hardship				
Often vs never	1.000	0.647	− 0.281, 2.281	0.12
Rarely vs never	1.000	0.655	− 0.299, 2.299	0.13

Within the multivariable model, rural–urban locality is associated with the depression score among these women, with rural farmworker women having significantly lower scores than the urban non-farmworker women. More urban non-farmworker than rural farmworker women (11.5% versus 6.1%) also reported elevated depressive symptom scores of 10 or greater. This reflects the one other study [12] comparing rural and urban Latinas, which found that urban women had significantly greater depression scale scores. Latinx children in urban non-farmworker communities also report more adverse childhood experiences than do Latinx children in rural farmworker communities [36]. Locality reflects the complex situation of Latinas in the USA. Latinas living in rural areas, even those subjected to the vulgarities of agricultural work, may obtain some level of mental health protection. Additional research on the components of locality is needed to parcel out the more proximal determinants of depressive symptoms in these communities.

Factors in the two domains immigration and acculturation, and family composition and disruption are associated with depression scores in the bivariate analysis but only marginally so in the multivariate analysis. Being born in the USA is associated with lower depressive symptom scores. Research among immigrant Latinas reports that immigration-related stressors, such as worry about immigration enforcement and broken social ties, are important [37]. Roblyer and colleagues [38] report that documentation status is a stressor among undocumented Latinas, but this stressor is not associated with greater depressive symptoms. Being fluent in English is also associated with lower depressive symptom scores. At the same time, the urban women were more likely to be fluent in English and to have higher depression scores. Research should address whether fluency has different functions or meaning among urban and rural Latinx women. For example, fluency may buffer against stress among rural women, but lead to greater awareness of discrimination, disparities, or fears of deportation among urban women.

The indicators of family composition and disruption, not being married (recall that all of the participants had at least one co-resident child that was 8 years old when recruited to the study) and living in a household with one or with three or more adults (versus two adults), are associated with a greater depressive symptom score among the participants. Family composition is reported to be associated with greater depressive symptom scores [21]. Similarly, lower family cohesion and social support are associated with higher depressive symptom scores [38]. The non-linear association of household size with depressive symptom score (single parent and households with three or more adults are associated with higher depressive symptom scores) suggests that being a single parent and caring for other adults as well as children are stressors.

As found in other analyses, occupation is not associated with depressive symptom scores in this study [12, 20]. Financial stability, as measured by food security and reporting a financial hardship, is not associated with depressive symptom score in this study. This is surprising and contradicts other findings for women in farmworker families [21]. It is also at odds with other research examining the association of financial status in other analyses of low-income populations in the USA [24, 25, 39, 40] and elsewhere [41]. This may be a result of homogeneity across the participants due to the inclusion criteria of having a total household income below 200% of the federal poverty level.

Limitations and strengths

Interpreting these results should be tempered by understanding the limitations of this research. The analysis is based on a small, non-random sample. Participants had to be mothers of an 8-year old child, and all were in low-income families (family income below 200% of federal poverty level). All of these factors limit generalizability. The analysis is cross-sectional, when the experience of depressive symptoms is cyclical [23]. The depression scores are low; it is unclear whether they reflect meaningful burden of depression or

small increments in very low general levels of self-reported symptoms. At the same time, PACE5 is a long-term community-based participatory research project with a history of collaboration with North Carolina Latinx farmworker and non-farmworker communities.

Conclusions

These results are testimony to the complexity of understanding mental health among immigrant women, particularly immigrant women in farmworker families. Where these immigrants live, in rural versus urban communities, provides a context for mental health. The importance of locality and the proximal determinants of locality require further analysis. Although financial status among these consistently low-income women was not associated with depressive symptom scores, unsurprisingly, acculturation and family composition were important to reporting fewer depressive symptoms. Further analysis of general mental health and depressive symptoms is needed to inform clinical care among Latina. This study is fortunate to have a wide perspective on the complexity of depressive symptoms in this community that will allow an examination of longitudinal data for these women.

Availability of Data and Material Due to the nature of this research, participants of this study did not agree for their data to be shared publicly, so supporting data are not available.

Code Availability Not applicable.

Declarations

Ethics The Wake Forest School of Medicine Institutional Review Board approved the study protocol 9IRB00043066).

Consent to Participate Adult participants gave signed informed consent; child participants in the larger study gave signed assent.

Consent for Publication Not applicable.

Conflict of Interest The authors declare no competing interests.

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