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HOUSEHOLD FOOD INSECURITY AND DEPRESSION AMONG SINGLE MOTHERS IN RURAL ALABAMA*

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ABSTRACT

Although we live in a wealthy nation, food insecurity, whereby individuals and families have limited or uncertain access to food due to lack of financial resources, continues to affect millions of American families. The objective of this study was twofold: to determine the prevalence of food insecurity among single mothers in rural Alabama; and to determine the extent to which food insecurity is associated with depression. Face-to-face interviews were conducted with 300 single mothers living in five rural counties in Alabama using the U.S. Household Food Security Survey Module and Center for Epidemiologic Study of Depression (CES-D) scale. About 36% of the 300 households were classified as food insecure. In bivariate analyses, household food insecurity was significantly associated with depression. After controlling for socioeconomic and demographic variables in multivariate analyses, household food insecurity was still positively associated with depression.

Although we live in a wealthy nation, food insecurity, whereby individuals and families have limited access to food or their ability to obtain food is limited or uncertain due to lack of financial resources, continues to affect millions of American families (Nord and Andrews 2003; Nord, Andrews, and Carlson 2002, 2005). According to the data released by the United States Department of Agriculture (USDA) in 2005, food insecurity affected 11.9 percent of U.S. households in 2004 (Nord et al. 2005).

Analyses of national survey data by Economic Research Service researchers also documented racial and regional differences in the likelihood of food insecurity and hunger among households (Bickel et al. 2000; Nord 2001; Nord and Andrews 2003; Nord et al. 2002, 2005). African American and Hispanic households are more likely than White households to be food insecure, and rural African Americans are an especially vulnerable group. Further, households at higher risk of being unable to

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secure adequate amounts of food because financial constraints are usually headed by single women, particularly by African American females.

State and regional differences in the prevalence of household food insecurity are also an important finding in the USDA series *Measuring Food Security in the United States* (Bickel et al. 2000; Nord 2001; Nord and Andrews 2003; Nord et al. 2002, 2005). The rural south in general, and Alabama in particular, experienced a significantly higher prevalence of food insecurity and hunger compared with the national 2000-2002 and 2002-2004 averages (Bickel et al. 2000; Nord 2001; Nord et al. 2002, 2005).

Though analyses at the national level have produced new insights into some aspects of the prevalence of food insecurity, its adverse health impacts are not well described. Little systematic information exists delineating the harmful mental health consequences of food insecurity as measured by the U.S. Food Security Module (Bickel et al. 2000). The limited information that is available suggests that children from food insufficient and hungry homes have a poorer overall health status than children from food secure households. Furthermore, children who live in food insufficient households are more likely to have poorer mental health and be withdrawn or socially disruptive (Alaimo, Olson, and Frongillo 2001; Alaimo et al. 1998; Casey et al. 2001; Kleiman et al. 1998).

Several studies have examined the impact of food insufficiency as measured by a scale derived from the National Health and Nutrition Examination Survey III on health status among adults in urban areas (Dixon, Winkleby, and Radimaer 2001; Heflin, Siefert, and Williams 2005; Nelson et al. 2001; Olson 1999; Roe 1990; Siefert et al. 2001, 2004). In these urban studies, poor or fair self-rated health status and depression were associated with food insufficiency. However, reports on the relationship between household food insecurity and psychological well-being in rural areas are limited. Furthermore, despite its potential impact on health and well-being, surprisingly little research has been done on the relationship between household food insecurity and mental health among poor female-headed families in the rural South. Except for the studies by Stuff et al. (2004) and Olson et al. (2004), I am unaware of any research that has examined the association between food insecurity as measured by the USDA Food Security Scale and self-reported depressive symptoms using the CES-D scale. However, Olson et al. (2004) used an earlier version of the USDA Scale and the CES-D measure in their study.

Therefore, the goal of this study is to contribute to the literature by determining the prevalence of food insecurity (measured with the current version of the USDA scale) and describing the association of food insecurity with emotional distress among single mothers. This is an important and timely topic because food insecurity may have

long-term consequences for women's physical and mental health. I hypothesized that food insecurity is positively associated with depression.

METHODS

This study was conducted as part of a larger project, Food Insecurity in Poor, Female-Headed Families in Five of Alabama Black Belt Counties, which was a one-year effort funded by the United States Department of Agriculture, Economic Research Service through the Southern Rural Development Center, Mississippi State University to address food insecurity among vulnerable populations in the rural South.

Study Site

Alabama's Black Belt, the site selected for this study, is an ideal case for research examining the prevalence and adverse health consequences of food insecurity in rural areas of the United States. The region is identifiable by its high concentration of African American inhabitants. Moreover, it is among the poorest places in the United States. Regionally, it was the area with the highest concentration of poverty in 2000, compared with other economically depressed regions including: the Appalachian mountain region, where the poor are predominantly white; the Valley/Texas Gulf Coast, where the poor are largely Latino; the Mississippi Delta, where the poor are predominantly African Americans; and the Native American reservations of the Southwest.

The Black Belt is home to persistent poverty, low employment, chronic unemployment, limited education, poor health, single parenthood and heavy dependence on public assistance programs (Zekeri 2001; 2003; 2004). The residents are, as the President's National Advisory Commission on Rural Poverty phrased it in 1967, "people left behind." In 2006, it is still a place left behind in many respects. The poverty-stricken character of the Black Belt contrasts sharply with the affluence of other areas in the United States. The five counties in this study (Bullock, Dallas, Lowndes, Macon, and Wilcox) are among those categorized by the USDA as counties experiencing "persistent poverty."¹ These counties have a disproportionate number of racial minorities and high rural populations (Zekeri 2003, 2004).

¹ The USDA Economic Research Service defines rural counties as persistent poverty counties if the poverty rate is 20 percent or higher each decennial census between 1960 and 1990.

Sampling

The sample for this study, 300 female-headed families receiving welfare and/or food stamp benefits, was randomly drawn from a list of more than 1,000 families from Bullock, Dallas, Lowndes, Macon, and Wilcox Counties that participated in my previous studies (Zekeri 2001; 2003; 2004). These counties have a large number of African Americans and individuals living below the poverty level. Also, these are counties where I had previously developed ties with many informants and local residents. Households were selected using random stratified sampling methodology. The randomly-selected single mothers were located at previous addresses, as well as through community informants and local churches. Once the selected mothers were located, we made personal home visits requesting participation in the study. Most of these single mothers were low-income individuals that had previously helped me understand their world - how they perceived it, coped with it, and interacted with it—and their opinions about electronic delivery of food stamps with the Benefit Security Card (Murray and Zekeri 2004; Zekeri 2001, 2003, 2004).

To obtain informed consent, we explained the purpose, procedures, risks, and benefits of the study. We also mentioned that each respondent would receive a gift at the end of the interview. They were given a \$15 gift certificate to buy food from Wal-Mart. Each single mother was provided with an information sheet that contained the contact information for Tuskegee University's Institutional Review Board, which had approved this procedure for obtaining informed consent.

Data Collection

A student research assistant and I collected questionnaire data in face-to-face, in-home, structured interviews with single mothers who were heads of the household from June 2005 to September 2006. The interviews lasted about 90 minutes. Food insecurity was measured using a structured questionnaire (based on the USDA's Food Security Core Module) and additional questions that had been approved by the Human Subject Participants Review Committee at Tuskegee University. The USDA's Food Security Core Module consists of an 18-item survey instrument constructed as a scale measure (Nord et al. 2005).

Variable Measurement

Demographics. I assessed demographic and personal characteristics of single mothers shown to be associated with depression in previous research: household income, age, level of education in years completed, use of food stamps, and employment status (Heflin et al. 2005; Siefert et al. 2000, 2001, 2004). Household

income (in dollars) and age (in years) were included as continuous variables. Race was a dummy variable coded 1 for African Americans. Education level was a dummy variable coded 1 for those with less than a high school diploma or General Educational Development certificate. Receipt of food stamps was a dummy variable coded 1 if the respondent received food stamps at the time of interview and 0 if she did not. Unemployment was also a dummy variable coded 1 if the respondent was unemployed and 0 if not.

Depression. I assessed the depression status of single mothers with items from the Center for Epidemiological Studies-Depression scale (CES-D). The CES-D is a well-known and widely used self-reporting instrument for assessing depressed mood that has construct validity and internal consistency (Radloff 1977). It has been used successfully for many years in the primary care setting. The CES-D consists of 20 items that cover affective, psychological, and somatic symptoms. For example, respondents were asked how many days in the past week: “you were bothered by things that don’t usually bother you,” “you did not feel like eating: your appetite was poor,” “you had trouble keeping your mind on what you were doing,” “you felt that everything you did was an effort,” “you felt sad,” “you felt hopeful about the future,” “you felt fearful,” “your sleep was restless,” “you were happy,” “you felt lonely,” and “you could not get going.” The depression variable was derived from summing the scores from 0 (rarely or not all, less than 1 day) to 4 (most of the time) for the items. Some of the above items were reverse-coded before including them in the scale. The Cronbach’s alpha for the scale in this sample is 0.93 indicating good inter-item reliability.

Household food insecurity. I calculated household food insecurity status using the six-item short form of the USDA Core Food Security Module.

Data Analysis

The analysis employed multiple regression methods using SPSS 14.0. First, depression was regressed on food insecurity to determine any statistically significant associations. Then, an expanded form of regression analysis examined effect estimates (regression coefficients) of food insecurity and the control variables on depression.

RESULTS

Demographics

Most of the single mothers were African Americans (65.5%) and 32.5% had no education beyond high school. Regarding household income, 50.2% earned less than

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\$10,000 and 46.2% had no health insurance. Some were unemployed (36.5%) and were looking for work. Overall, a majority of the respondents were poor, had low educational attainment, lived in poor-quality housing, and were receiving food stamps (Table 1).

TABLE 1. DEMOGRAPHICS^a

CATEGORY	PERCENT
Race/Ethnicity	
African American.....	65.5
White.....	29.0
Hispanic.....	2.8
Educational Attainment	
Did not complete high school.....	32.5
Completed high school or equivalent.....	33.7
Some college of post high school training.....	24.5
Completed a college degree.....	9.2
Income	
Under \$10,000.....	50.2
\$10,000 to \$14,000.....	49.5
Employment Status	
Employed (including part-time).....	60.3
Unemployed.....	36.5
Health Insurance	
Yes.....	53.8
No.....	46.2
Participating in Food Stamp Program	
Yes.....	54.1
No.....	44.0

^aSome percentage scores do not sum to 100% because some respondents did not answer the question.

Prevalence of Food Insecurity

Using the USDA six item food insecurity scale, 35.7% of the sample was classified as food insecure. Respondents who answered “yes” to one or none of the items are considered food secure, those who said “yes” to 5-6 items are classified as food insecure. prevalence of food insecurity in this sample was almost three times the national level of 11.9% and the 12.2% level for the state of Alabama from 2002-2004 (Nord et al. 2004).

Nearly two-thirds (63.9%) said either that the food they bought did not last and they did not have money to buy more or (65.9%) that they could not afford to eat balanced meals (Table 2). Approximately 40% (38.5%) reported cutting the size of

TABLE 2. USDA CORE FOOD INSECURITY VARIABLES (RURAL ALABAMA SAMPLE)

	PERCENT
1. The food that I/we bought just didn't last, and I/we didn't have money to get more (often true, sometimes true = 1; never true = 0).	63.9
2. I/we couldn't afford to eat balanced meals (often true, sometimes true = 1; never true = 0).	65.9
3. In the last 12 months did you and/or other adults in your household ever cut the size of your meals or skip meals because there wasn't enough money for food? (yes = 1; no = 0)	38.5
4. If yes, how often did this happen? (almost every month, some months but not every month = 1; for only 1 or 2 months.....	32.5
5. If yes, in the last 12 months, did you ever eat less than you felt you should have because there wasn't enough money to buy food? (yes = 1; no = 0).	33.7
6. If yes, in the last 12 months, were you ever hungry but didn't eat because you couldn't afford enough food (yes = 1; no = 0).....	24.5
No.	44.0

Source: Short Form of the 12 Month Food Security Scale prepared by Bickel et al. 2000

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meals or skipping meals because there was not enough money for food and 30% said they cut meal sizes or skipped meals almost every month. Forty-six percent reported eating less than they felt they should because there was not enough money to buy food; and another 34% reported being hungry but not eating because they could not afford enough food.

Food Insecurity and Depression

The results in Table 3 indicate that as anticipated, and consistent with previous research (Heflin et al. 2005; Olson 1999, 2005; Siefert et al. 2001, 2004), the association between food insecurity and depression is positive and statistically significant (see Model 1). The association is strong and the R^2 is .103. In the bivariate analysis, food insecurity alone explained 10.3% of the variation in depression. Thus, single mothers that were food insecure reported significantly higher levels of depression.

TABLE 3. UNSTANDARDIZED AND BETA COEFFICIENTS FROM REGRESSION OF DEPRESSION ON FOOD INSECURITY AND THE CONTROL VARIABILITY

INDEPENDENT VARIABLES	MODEL 1		MODEL 2	
	b-VALUE	BETA	b-VALUE	BETA
Food insecurity	6.04	.32	4.67*	.25
Age			-.03	-.03
Full-time employment ^a (yes = 1)			-2.85**	-.18
Race ^b (Black = 1)			-.92	-.04
Education			-2.99	-.15
Adjusted R ²	.10		.17	

* $p < .05$; ** $p < .01$; ^aWhite persons are the reference group; ^bUnemployed persons are the reference group.

Additionally, and in accord with earlier work (Siefert et al. 2001; 2004), Model 2 in Table 3 indicated that among the predictor variables, food insecurity was still a statistically significant predictor of depression. In the multivariate analysis, food insecurity was by far the strongest predictor of depression among these poor single mothers in rural Alabama ($\beta = .246$). Single mothers who were food insecure, less

educated and unemployed reported significantly higher levels of depressive symptoms.

Taken together, this set of analyses provided support for the hypothesis: Food insecurity is positively related to depression.

DISCUSSION

The objectives of this research were to estimate the prevalence of food insecurity in selected counties in rural Alabama and to determine the extent to which food insecurity is associated with depression. Food insecurity was moderately high in nearly 36% of female-headed households in the Alabama Black Belt. It was three times as common in this sample of female-headed families as in the general U.S. population in 2004 (Nord et al. 2005). (see Table 2). This finding supports those of other studies that have found levels of food insecurity to be substantially higher among welfare recipients than among the U.S. population (Siefert et al. 2000; 2001).

This study also found that food insecurity is a significant predictor of depression. The association remained statistically significant after controlling for age, employment status, race and educational attainment. Food insecure single mothers reported higher levels of depression than their peers who are food secure. These results extend previous research findings that food insufficient households were more likely to exhibit major depression and poor health (Heflin et al. 2005; Olson et al. 2004; Siefert et al. 2000, 2001, 2004; Tarasuk and Beaton 1999; Vozoris and Tarasuk 2003). This study advances our knowledge of this relationship by focusing on the link between food insecurity and depression in rural areas where access to physical and mental health treatment can be even more difficult to obtain than in urban areas. Moreover, the majority of the previous studies used a single item measure of food insufficiency, whereas this study used the U.S. Food Security Module scale to measure food insecurity allowing researchers to be more confident in the reliability and validity of the finding (Alaimo et al. 1998, 2001; Heflin et al. 2005; Siefert et al. 2001, 2004).

In sum, the association of food insecurity with self-reported mental health, regardless of causal direction, shows the precarious situations that poor single mothers in rural areas face. The findings highlight the need to prevent food insecurity and ensure that all rural southerners are adequately fed to improve their mental health and social well-being. Alleviating food insecurity may lower the risk of depression, as well as having the potential to improve physical health. Health care providers must be sensitive to multiple barriers faced by food insecure single

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mothers; acknowledging and improving access to balanced meals and assessing for depression will promote better overall health within this population.

Two limitations of this study should be noted. First, the cross-sectional design makes it impossible to draw causal inferences from the findings. For example, while contending that food insecurity predisposes individuals to poor health, the reverse could also be true. Therefore, I cannot say exactly how mental health changes and whether poor mental well-being limits the ability of single mothers to earn a productive income that may prevent food insecurity. However, the relationship found here between food insecurity and mental health is likely to be condition specific. Longitudinal data are required to ascertain the true nature of the relationships found in this rural sample. Second, the dependent variables were based on self-reported conditions. Future research examining these relationships in relation to objective measures of health and food insecurity to confirm my finding is needed. I hope that these results will encourage additional research using the U.S. Food Security scale to examine how social factors can lead to personal well-being.

Recommendations

The results of this study indicate that a substantial percentage of single mothers in rural Alabama who are responsible for taking care of their families are experiencing food shortages and worry about whether their children will have enough to eat. Furthermore, food insecurity involves physical, physiological, and psychological consequences. Thus, food insecurity should be treated as a health issue that should concern not only social scientists but also clinicians and dieticians in the 21st Century.

AUTHOR BIOGRAPHY

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