

An Ecological Perspective on Rural, Low-Income Mothers' Health

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Using structural equation modeling, this study examined interactions among factors traditionally associated with health outcomes within a sample of rural low-income mothers. Prior research has established that education, employment, income, marital status, and health insurance coverage independently predict health outcomes. However, no studies have examined the simultaneous influence of these factors as conceptualized from an ecological systems perspective. Results indicate that when the multiple factors are considered simultaneously, different effects emerge. Implications are that the context in which these women live and the interactions between and among key influencing factors must be considered when addressing health challenges in rural areas.

Keywords: Rural, low-income women, health care utilization, health disparities, health care reform

Understanding the diverse factors that influence health and well-being among rural low-income mothers is critical, as inequalities in health persist despite ongoing efforts to improve health care quality, access, and affordability for vulnerable citizens in the United States (Agency for Healthcare Research and Quality [AHRQ], 2013). Emerging research indicates that rural female mortality rates continue to rise despite an increase in medical care expenditures and public health efforts (Kindig & Cheng, 2013). Given that women living within the context of rural poverty confront multiple interrelated challenges to their health and well-being (Bice-Wigington & Huddleston-Casas, 2012; Carlton & Simmons, 2011; Simmons, Huddleston-Casas, Morgan, & Feldman, 2012), it is especially critical to understand how the “interactions” among these various individual and systemic factors influence health outcomes, so that access to appropriate interventions can be developed. Unique to this article, we additionally consider how factors traditionally identified as vulnerabilities for health and health decision making may also be “opportunities,” depending upon other contextual factors influencing the individual. Thus, the purpose of this study was to examine multiple interacting factors as potential vulnerabilities and/or opportunities that interact and subsequently influence self-reported health status, symptoms of depression, and health care utilization within the context of being rural, low-income, female, and a parent to young children within a U.S. sample.

RURAL HEALTH INEQUALITIES: VULNERABILITIES AND OPPORTUNITIES

It has been well established that rural populations experience significant health inequalities when compared to their urban counterparts (Centers for Disease Control and Prevention [CDC], 2013). With approximately 15% of the U.S. population residing in rural areas, more than 46.2 million U.S. residents experience poor health (Economic Research Service [ERS], 2013; Merwin, Snyder, & Katz, 2006). Compared to their urban counterparts, rural residents report higher incidence and prevalence of preventable chronic diseases, disability, morbidity, and mortality (AHRQ, 2013; Larson & Correa-de-Araujo, 2006). Rural adults are more likely to be physically inactive and obese and experience dental problems, depression, suicide, and motor vehicle accidents (AHRQ, 2013; Lewis et al., 2006).

Rural Women

Compared to their urban counterparts, rural women experience higher prevalence of chronic diseases, including cervical cancer, type 2 diabetes, hypertension, heart disease, stroke, and lung disease (Coward, 2006; Kindig & Cheng, 2013). Health care delivery for rural women is often an overlooked and misunderstood issue when addressing inequalities in health (Gamm, Hutchinson, Dabney, & Dorsey, 2003). Women with chronic disease are more often undertreated, not treated at all (Ahluwalia, Tessaro, Greenlund, & Ford, 2010), and diagnosed at later, more severe stages (Rayman & Edwards, 2010). Similarly, rural women underutilize and lack access to routine and preventive care. Rates of prenatal care are lower than national averages, resulting in disproportionately higher fetal, infant, and maternal mortality rates in rural areas (Hageman, Pullen, Walker, & Boeckner, 2010; Health Resources and Services Administration [HRSA], 2012; Rayman & Edwards, 2010). Further, rural women are less likely to obtain breast and cervical cancer screenings (National Advisory Committee of Rural Health and Human Services, 2008). Finally, rural women are more likely to engage in unhealthy behaviors such as smoking, alcohol use, poor eating habits, and low physical activity, and often do not adhere to medical recommendations (Coward, 2006; HRSA, 2011).

Mental health inequalities also exist among rural women, including a higher prevalence of depressive symptoms than the general population (Simmons, Huddleston-Casas, & Berry, 2007). Despite evidence that psychological complaints account for more than 40% of patient visits to rural medical providers (Hauenstein & Peddada, 2007), rural women are less likely to receive any form of mental health care (Hoge et al., 2007). Due to stigma, cost, lack of awareness, time constraints, and lack of service providers (Mulder et al., 2000; Ward, Clark, & Heidrich, 2009) the mental health needs of rural women are unmet.

Access to Health Care Services

Rural residents across all socioeconomic groups experience similar barriers in accessing health care and preventive services as those encountered by lower socioeconomic groups in urban and suburban areas (Merwin et al., 2006), thereby increasing risk of chronic diseases, poor health behaviors, and inadequate health insurance coverage (Bennett, Lopes, Spenser, & van Hecke, 2013; ERS, 2013). They also have decreased access to preventive health programs, such as cancer screenings (National Commission on Prevention Priorities, 2007; Schroeder, 2007). Although prior research delineates a constellation of factors associated with rural health inequalities and poor health outcomes (Ahmed, Lemkau, Nealeigh, & Mann, 2001; Grumbach, Hart, Merz, Coffman, & Palazzo, 2003), the lack of access to physical, mental, and ancillary health care services is the most frequently cited cause (Merwin et al., 2006; Panelli, Gallagher, & Kearns, 2006). Research reveals that rural individuals and families experience difficulties accessing health-related services due to a

systemic lack of health care providers (Skillman, Patterson, Lishner, & Doescher, 2013), and a limited health care infrastructure (HRSA, 2012). In fact, it is estimated that only 10% of all practicing physicians work in rural communities (AHRQ, 2013; Merwin et al., 2006), designating most rural communities as health provider shortage areas (Skillman et al., 2013). However, at least one study has shown that rates of providers, access to a community health center, and living in a health professional shortage area did not influence health care-seeking behaviors among rural women (Carlton & Simmons, 2011). Rather, “perception” of available services in this study was associated with health care seeking, suggesting the potentially important mediating factor of health knowledge.

Health Insurance

Rural women who had some form of health insurance were more likely to receive appropriate medical care and fill prescriptions (Carlton & Simmons, 2011). Additionally, having a “regular” provider significantly influenced the utilization of preventive and need-based health care among rural women (Simmons, Anderson, & Braun, 2008). Yet those without health insurance were less likely to have a health care provider or to utilize preventive medical services within their community (Taylor, Cohen, & Machlin, 2001). The financial burden associated with accessing basic medical care often prevents low-income families from seeking treatment for treatable illnesses, despite having insurance (Hastings, Taylor, & Austin, 2005). For example, rural residents reported spending 32% more on prescription medications than urban residents in 2011 (Hawk, 2013).

Rural Poverty

Rural health outcomes must be understood through the context of rural poverty in that rural communities are economically disadvantaged when compared to urban communities, as poverty rates are higher and persist longer (ERS, 2013). In 2012, the poverty rate for rural areas (17.7%) exceeded national (15%) and urban (14.5%) poverty rates (ERS, 2013). Further, rural counties continue to make up 85% of the counties experiencing persistent poverty, where 20% or more of those residing in persistent poverty counties experienced poverty over the span of three decades (Blakely & Locke, 2005; ERS, 2013). Rural poverty affects all rural residents, directly and indirectly, because access to knowledge, resources, and opportunities (Crimmins, Hayward, & Seeman, 2004) that either promote or impede health outcomes are dearth. Thus, rural low-income women confront barriers stemming from their status as rural residents in combination with the challenges related to their low socioeconomic status.

Education and Employment

Rural communities face multiple challenges in ensuring educational opportunities for their residents, such as adequate funding (Johnson & Lichter, 2010) and the recruitment and retention of effective teachers (Byun, Meece, Irvin, & Hutchins, 2012). Rural individuals are less likely to participate in higher education and/or earn a college degree (Byun, Meece, & Irvin, 2012) and have lower educational expectations (Rosigno & Crowley, 2001). Limited education is associated with risky health behaviors, lower health literacy levels, and less exposure to health information (Davis et al., 2003) in turn perpetuating poor health outcomes.

Combined with the lack of educational opportunities, rural individuals also face a decrease in employment opportunities. With the rise of service-related jobs in rural communities, an increase in lower-wage jobs with little benefits (National Advisory Committee of Rural Health and Human

Services, 2008) perpetuates underemployment and subsequent poverty within rural working families (Slack & Jensen, 2002) who earn less than a family-sustaining wage (O'Hare, 2009).

Employment opportunities and educational attainment for rural women may be further limited by cultural mores that promote traditional patriarchal gender roles and expectations (Flora & Flora, 2004; Leipert & George, 2008). For example, obtaining a college education does not guarantee rural women greater access to economic opportunity than their peers with a high school diploma (Porterfield, 2001). Further, cultural expectations often equate to decreased employment for women once they become mothers to meet the demands of family responsibilities and to support their spouse's employment efforts (Maume, 2006).

Family

During the childbearing years, when family needs are the greatest, rural women must negotiate multiple challenges in an effort to protect, maintain, and restore health for themselves and their families (Andrews, Darnell, McBride, & Gehlert, 2013). Such negotiations often leave mothers to put aside their needs to meet the needs of their children and partners. Further, marriage appears to curb the use of health care, as evidenced by shorter average hospital stays and fewer physician visits; however, these patterns of lower usage are not linked to a quicker recovery or better health but rather to wives' provision of informal care for their partners at home (Wood, Gosselin, & Avellar, 2007).

Although research suggests that marriage provides a protective barrier against contextual challenges that contribute to poor health outcomes among individuals and families (Hill, Reid, Reczek, 2013; Mirowsky & Ross, 2003), low-income couples may not experience such "protection" (Hill et al.) because marriage may not alleviate financial hardships. Protective factors associated with marriage include financial stability (HRSA, 2011), increased access to health insurance (Wood et al., 2007), and improved utilization of preventive care (Lee et al., 2005). In their review of literature synthesizing the effects of marriage on health in rural couples, Wood et al. (2007) concluded that the effect of marriage on health behaviors as well as mental and physical health is mixed. Despite associations with healthier behaviors such as reductions in alcohol and drug use, marriage is also linked to unhealthy behaviors such as decreases in physical activity. Wood et al. also found that, though marriage appears to reduce depressive symptoms, studies are limited by a focus on marital transition (marriage or divorce) and lack the longitudinal data needed to understand long-term effects. Further, though marriage is reported to have a positive effect on how men rate their overall physical health status, this effect is not found for women. As a whole, Wood et al. asserted that research linking marriage and physical health is limited in scope to a "narrow range of health measures" providing an incomplete picture of the influence of marriage on health. In fact, research by Kiecolt-Glaser et al. (2005) contributes to a growing body of epidemiologic data documenting that individuals in troubled marriages are actually more prone to illness than those in happier relationships suggesting the effects on health are more likely associated with the quality of the relationship over the status of being married.

Another status important to women's health is motherhood. Unlike pregnancy and childbirth occurring within defined episodes, once assumed, the status of motherhood is continuous across a woman's lifetime (Bernstein, 2001). Although researchers have increasingly addressed women's health, attention to women as mothers is overwhelmingly focused on access to prenatal care and issues surrounding postpartum depression (Carter, McGoldrick, & Petkov, 2011). One study examining differences between mothers and nonmothers found mothers age 18 to 44 perceived themselves as less healthy but did not differ in their prevalence of major chronic conditions or in the likelihood of taking prescription medication on a regular basis. Both groups were equally likely to experience depressive symptoms with mothers averaging more symptoms than nonmothers. Despite no differences in problems accessing care, mothers were more likely to report a usual

source of care. The two groups diverge on health care utilization with mothers' prenatal and perinatal care driving the difference (Bernstein, 2001). However, beyond childbearing, the study does not assess differences when mothers no longer receive prenatal and perinatal care. In a study of rural low-income women, Simmons et al. (2012) suggested that mothers do not seek needed care due to prioritizing the health care needs of their children over their own.

CONCEPTUAL FRAMEWORK

To date research examining rural health has failed to address how the intersection of relevant factors and contexts within rural populations and communities facilitate health disparities. Although the importance of "place" is increasingly being recognized in the medical literature (Farmer, Munoz, & Threlkeld, 2012), relatively few theories have been applied to understand the dynamics of context. Further, examinations of rural health disparities in the social science literature frame the context as either an "idyllic rural life" backdrop (Flora & Flora, 2004) or a traditional culture valuing self-reliance and independence (Strickland & Strickland, 1996), as well as individual autonomy (Carger & Westen, 2010). Missing from all of these discussions, however, is a consideration of the contextual influences on health outcomes among rural low-income women through the lens of Bronfenbrenner's ecological systems model (Bronfenbrenner & Morris, 2006). This model provides a holistic understanding of health and well-being and views individuals and the environment as a unitary system within a particular cultural and historical context (Germain & Gitterman, 1996). In this study we focused on the ecological principal of interactionism by analyzing the simultaneous effects of multiple interacting individual and community factors on self-reported health problems, symptoms of depression, and health care utilization among rural low-income women. Through this analysis we conceptualized the multiple interacting factors as creating potential vulnerabilities or opportunities that, in turn, shape the context in which rural low-income women navigate the multiple exchanges in their environment that influence health decisions and outcomes.

DATA AND METHOD

The sample of 304 women in this study was drawn from Rural Families Speak (RFS), a longitudinal multistate research project designed to assess the well-being of rural low-income mothers and their families after the 1996 Welfare Reform. The larger RFS dataset comprises 465 participants from nonmetropolitan counties in 14 states¹ across the United States (populations between 2,500 and 19,000), as identified through the Butler and Beale (1994) coding scheme. Eligible RFS participants were women age 18 years and older with at least one child age 13 years or younger and a family income below 200% of the poverty threshold. The sample for this study comprises the 315 women who completed Wave 1 and Wave 2 of the RFS project. Of those 315 women, this study utilized only those with full health data at Time 2, resulting in a sample of 304.

RFS participants were recruited through a self-selection process where informational fliers with eligibility criteria were posted at sites that participants might frequent, including Head Start programs, Medicaid and Women, Infants, and Children (WIC) offices, and adult education sites. To ensure sensitivity to ethical issues, RFS investigators obtained necessary approvals from the Institutional Review Boards of their respective universities. Across all data collection sites, interviewers trained in the RFS protocol collected quantitative and qualitative data using standardized measures as well as semistructured interviews. This article reports findings from quantitative data.

Measures

Women's self-reported health status was operationalized using a 29-item scale at Times 1 and 2, in which participants responded *yes* or *no* to whether they experienced specific health problems (e.g., high blood pressure, diabetes, cancer, depression, joint pain, fatigue, allergies, frequents colds, and headaches). The count represents the sum total of *yes* responses indicating reported health problems.

Symptoms of depression were operationalized using the Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977), in which participants responded to the frequency of depressive symptoms based on a 4-point scale. For the purpose of this study, a score of 21 or higher was utilized as the cutoff point to determine if participants screened as depressed or experiencing symptoms of depression (Zich, Attkisson, & Greenfield, 1990). The higher cutoff has demonstrated greater sensitivity and specificity in identifying depression when compared to diagnostic clinical interviews (Sean & Baldwin, 2008).

Health care utilization was operationalized using a continuous variable where participants provided an estimated number of visits to a health care provider within the last 12 months at the Time 1 (T1) interview.

Vulnerabilities and opportunities were selected based on those factors shown in the literature to affect rural health outcomes and that presented variability within the sample. Age was a continuous variable of participants' reported age in years at T1. Marital status was a categorical variable using participants' responses to their relationship status at T1 (1 = *single*, 2 = *divorced*, 3 = *separated*, 4 = *living with partner*, 5 = *married*). Level of education was categorical using participants' responses to the highest level of education completed at T1. Health insurance was categorical based on participants' reports of having any insurance for themselves at T1. Employment status was operationalized using participants' responses to current employment status as unemployed, part-time work, or full-time work at T1.

Analysis

We developed a model (Figure 1) that explored the aggregate effect of multiple vulnerabilities and opportunities on self-reported health status, symptoms of depression, and health care utilization among a sample of rural low-income women. We considered the influences of these factors simultaneously, hypothesizing that the interactions between and among them shape the context in which rural low-income women conceptualize health and navigate their health care.

Analysis occurred in two steps. First, the relationships between the variables were assessed using bivariate correlations in SPSS (version 21). Bivariate correlations, standard deviations, and means for each of the observed variables are presented in Table 1. Statistically significant correlations are presented at the $p > .05$ and $p > .01$ levels. Next, structural equation modeling (SEMs) was utilized to test the hypothesis using Mplus (Muthen & Muthen, 2009).

Upon the assumption that the variables of interest would affect perceived health over time, as outlined in the previously stated hypothesis, the model is presented with fully standardized (STDYX) coefficients. Maximum likelihood (ML) was utilized to account for missing data, as ML utilizes available data from variables with values to obtain likelihood values of missing data points.

To assess the quality and statistical significance of the model, several fit indices were utilized. Chi-squared was used to test the hypotheses, in that the relationships proposed in both models provided an explanation of the relationship that exists in the data. A nonsignificant chi-squared value indicates a good fit, whereas a significant value indicates that the given model's covariance structure is significantly different for the observed covariance matrix (Kline, 2005) and is not a good fit for the data. Taking into consideration that the chi-squared statistic often lacks power when used with a small sample (as in this study), leading to the inability to discriminate between good

TABLE 1
Standard Deviations, Means, and Intercorrelations Between Study Variables

	Age	Currently employed	Educational level	Health insurance	Single	Married	Living with partner	Symptoms of depression	Health care utilization	Self-reported health status at Time 1	Self-reported health status at Time 2
Age	1										
Currently employed	-.119*	1									
Educational level	.145*	-.178**	1								
Health insurance	-.178**	-.224**	.129*	1							
Single	-.178**	-.224**	.129*	-.148*	1						
Married	-.178**	-.224**	.129*	-.148*	-.148*	1					
Living with partner	-.178**	-.224**	.129*	-.148*	-.148*	-.148*	1				
Symptoms of depression	-.178**	-.224**	.129*	-.148*	-.148*	-.148*	-.148*	1			
Health care utilization	-.178**	-.224**	.129*	-.148*	-.148*	-.148*	-.148*	-.148*	1		
Self-reported health status at Time 1	.167*	-.180**	-.185**	-.185**	-.185**	-.185**	-.185**	-.185**	.256**	1	
Self-reported health status at Time 2	.243**	-.185**	-.185**	-.185**	-.185**	-.185**	-.185**	-.185**	.230**	.792**	1
<i>M</i>	29.5	.49	1.4	.44	.40	.495	.37	16.8	2.93	4.22	3.69
<i>SD</i>	7.06	.293	1.4	.44	.40	.495	.37	11.02	2.45	3.5	3.29
<i>N</i>	290	293	292	146	304	304	304	284	293	287	304

p* significant at .05; *p* significant at .01 (2-tailed).

fitting models and poor fitting models, additional indices were utilized to assess model fit (Kenny & McCoach, 2003).

The Comparative Fit Index (CFI) and Tucker-Lewis Index (TLI) were utilized as incremental fit measures. Both indices are similar in nature as each compares the fit of the model to a null model or independence model, respectively. Further, both indices perform well among small samples. In both cases the indices vary from 0 to 1, where indices greater than .90 indicate an acceptable fit for the estimated model (Kline, 2005). Finally, the root mean square error of approximation (RMSEA), which is the measure of incongruence per degree of freedom, was utilized to measure absolute fit (Kline, 2005). An RMSEA less than or equal to .05 indicates close approximate fit, values between .05 and .08 suggest reasonable error of approximation, and values greater than .10 suggest poor fit (Browne & Cudeck, 1993).

RESULTS

Sample Characteristics

Because RFS eligibility criteria specified that participants had to be female, age 18 and older, living in families with incomes below 200% of the federal poverty line, and have at least one child age 13 or younger, the sample was relatively homogenous with little variability in demographic characteristics.

The all-female sample had an average age of 29.5 years (range 18–58 years) at T1. A large portion of the participants identified themselves as White (68.1%), followed by Hispanic (18.4%), and African American (6.9%); the sample is representative of the total RFS sample. Participants' educational levels ranged from less than an eighth-grade education to a graduate degree, with 17.8% having some high school education or less, 30.1% of the participants holding either a high school diploma or a Graduate Equivalency Diploma, and 40.8% having either vocational training or attended some college without degree attainment. Further, a large proportion of the participants reported either being married (42.8%) or living with a partner (16.1%). On average spouses/

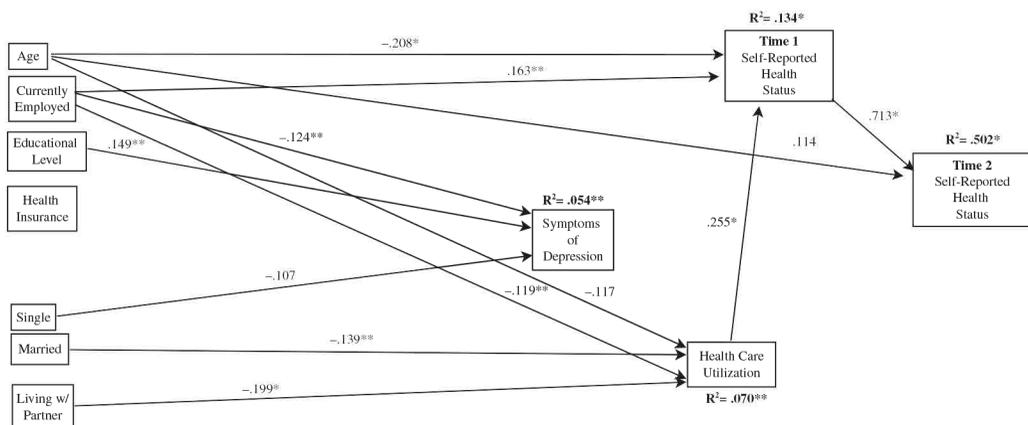


FIGURE 1 Model of vulnerabilities and opportunities influencing health decisions and outcomes ($n = 304$). Results are presented with fully standardized (STDYX) coefficients. The model yields reasonable fit indices (Chi-Square 14.783, $df = 9$, $p = 0.0971$, CFI = .978, TLI = .906, RMSEA = .046, SRMR = .016). Results revealed that when controlling for the combined influences simultaneously, several variables influenced self-reported health status, symptoms of depression, and utilization of health care. $*p < .001$. $**p < .05$ (2-tailed).

partners were age 30 years at T1. The majority of participants reported having 2.26 children residing in their home at the T1 interview, and, on average participants were age 20.9 when they first became a parent. Participants reported the mean age of their oldest or only child as 7 years, among those with more than one child the second child was on average 4 years. Almost one half of the participants was employed (45.4%) either part- or full-time. More than one half (64.7%) of the participants reported having health insurance. Of those participants who reported having health insurance 60.8% reported having coverage through Medicaid, 10.5% reported having coverage through a State Health Plan, and 29% reported having coverage through a private/health maintenance organization (HMO) plan. Participants reported having significant health problems (28% report as having one to two health problems, 20% three to four health problems, and 38% as having five health problems).

Model Results

Results are presented in Model 1, with fully standardized (STDYX) coefficients. Model 1 yields reasonable fit indices ($\chi^2 = 14.783$, $df = 9$, $p = .0971$, CFI = .978, TLI = .906, RMSEA = .046, standardized root mean square residual [SRMR] = .016). Results revealed that when controlling for the combined influences simultaneously, several variables influenced self-reported health status, symptoms of depression, and utilization of health care.

Self-reported health status at Time 1. One standard deviation (SD) increase in a participant's age was associated with a decrease in self-reported health status, or an increase in reported health problems at T1 ($SD = .208$, $p > .001$), as well as indirectly at T2 ($SD = .148$, $p > .001$). At the same time a SD increase in employment status, or being employed, was associated with an increase in self-reported health status, or a decrease in reported health problems at T1 ($*SD = .163$, $p > .05$) and indirectly at T2 ($SD = .117$, $p > .05$). All other variables of interest did not significantly influence self-reported health status at T1 or indirectly at T2.

Symptoms of depression. One SD increase in a participant's educational level was associated with an increase in depressive symptoms ($SD = .149$, $p > .05$). At the same time a SD increase in employment status, or being employed, was associated with a decrease in symptoms of depression ($SD = .124$, $p > .05$). In addition, being single was nearly significant ($SD = .107$, $p > .057$) with a decrease in depression symptoms. The relationship between self-reported health status and symptoms of depression was nearly significant ($SD = .114$, $p > .053$), and an increase in reported health problems was nearly related to an increase in symptoms of depression. No other factors significantly influenced depressive symptoms.

Utilization of health care. All significant relationships decreased the report of healthcare utilization. First, being employed was associated with a $SD = .119$ ($p > .05$) decrease in reported health care utilization at T1. Secondly, being married ($SD = .139$, $p > .05$) and living with a partner ($SD = .199$, $p > .001$) were associated with a decrease in reported health care utilization. In addition, a participant's age was nearly significant ($SD = .155$, $p > .057$) with a decrease in reported health care utilization. Conversely, an increase in health care utilization was associated with a $SD = .254$ ($p > .001$) decrease in self-reported health status, or an increase in reported health problems.

Self-reported health status at Time 2. Results demonstrated that a standard deviation decrease in self-reported health status at T1 was associated with a $SD = .713$ ($p > .001$) decrease in self-reported health status at T2. It is important to note that there is a statistically significant difference in self-reported health status at T2 and T1, $t(286) = 3.515$, $p < .001$. Participants reported more health problems at T1 ($M = 4.22$) than at T2 ($M = 3.69$). Additionally, health care utilization and symptoms of depression did not significantly influence self-reported health status at T2.

In sum, by looking at the multiple interacting factors simultaneously our ability to see a holistic view of health and well-being among rural low-income mothers emerges. The constellation of factors that influence self-reported health status, symptoms of depression, and utilization of health care are quite different than traditionally understood. Specifically, age was associated with a decline in self-reported health yet was nearly significant with a decrease in reported health care utilization. Employment status was associated with an increase in self-reported health, a decrease in symptoms of depression, and a decrease in reported health care utilization. Educational attainment was associated with an increase in symptoms of depression. Furthermore, being married or living with a partner was associated with a decrease in reported health care utilization. In addition, being single was nearly significant with a decrease in depressive symptoms.

DISCUSSION

This study explored the multiple levels of influence on health status and health care utilization for women living at the intersection of rural residence, poverty, and motherhood to better understand how these factors function as vulnerabilities and/or opportunities when examined simultaneously as opposed to individually. Importantly, we demonstrated that when the multiple influences are considered simultaneously, different effects emerge for age, level of education, and intimate partner status than previous studies have reported. These differences demonstrate that the context in which these women live and the interactions between and among key influencing factors must be considered when addressing health challenges in rural areas.

Taken in isolation it is not surprising that age and employment status were associated with self-reported health status, as this is consistent with prior research (CDC, 2013; Jamoom, Horner-Johnson, Suzuki, Andresen, & Campbell, 2008). First, as age increases there is a natural decline in physical and psychological health (Jamoom et al., 2008). This decline for women is most evident at the end of their childbearing years as they enter the premenopausal stage (Mishra, Brown, & Dobson, 2003). It is important to acknowledge that in this study the majority of participants were age 29.5 years, still well within their childbearing years. Despite the relatively young age of the sample, nearly one half (48%) reported one to four health problems, and another 38% reported five health problems or more. The high prevalence of health problems notwithstanding, there was a significant decrease in health care utilization with increasing age, which is inconsistent with utilization trends in the national population (CDC, 2004). This finding may be the result of perceived poor access to health care services or the effect of lower educational levels, which is associated with low health literacy and lack of understanding around managing chronic conditions (Davis et al., 2003). It also may reflect how limited resources influence health decision making, including mothers who place the needs of their family ahead of their own when finances are tight (Simmons, Huddleston-Casas, Morgan, & Feldman, 2012).

Prior research suggests that individuals with lower educational attainment are more likely to self-report poor health than those with higher educational attainment (Subramanian, Huijts, & Avendano, 2010). However, in our model educational attainment was not significantly related to self-reported health status, though an increase in educational attainment was significantly associated with an increase in symptoms of depression. These findings further demonstrate how contextual factors known to influence health may buffer, exacerbate, or mask important relationships when considered simultaneously with other factors. That is, though it is assumed that higher educational attainment improves health because individuals presumably have greater health literacy and can better manage their health and health care, for rural, low-income women who are struggling with other challenges like poverty, isolation, and childrearing in an environment with limited opportunities, education does not provide the same protection. Moreover, given the limited

employment opportunities and affordable child care services in rural areas, the inability to fully utilize earned education and experience may make these women more vulnerable to depression than women living in communities with more resources, turning educational attainment into a vulnerability as opposed to an opportunity in this population.

Our results demonstrated that being employed either part- or full-time was associated with fewer reported health problems and symptoms of depression, despite low socioeconomic status. This is consistent with previous studies; Leipert and George (2008) found that employment was “one of the most important determinants of rural women’s health” behind poverty (p. 216). However, it is important to note that employment does not automatically equate to better health or economic self-sufficiency within the rural context (National Advisory Committee on Rural Health and Human Services, 2008). In fact, among our sample employment was not significantly associated with health care utilization, despite prior research that suggests a positive association between employment and health care utilization (Hewitt, Baxter, & Western, 2006). A number of job-related factors may explain this finding. Hourly jobs dominate rural communities, and these jobs tend to be less flexible and not provide paid time off for medical appointments (Swanberg & Simmons, 2008). Additionally, these jobs often do not provide health insurance coverage.

Having health insurance was not significantly associated with self-reported health status or healthcare utilization, despite the fact that more than 64% of participants reported having some form of health insurance. Indeed, health insurance alone does not guarantee access to health care services (Simmons et al., 2012), nor does it mean individuals will utilize those services even when they are accessible (Harellick, Viola, & Tahara, 2010; Kitsantas, Gaffney, & Cheema, 2012). This is specifically true in rural communities where residents may need to travel far distances to obtain necessary care (Arcury et al., 2005). In addition, just because care is available, it does not mean that utilizing those services is acceptable in those communities, which is specifically true for mental health care. In our sample, the majority of all health insurance coverage reported by this population was Medicaid; however, it is possible that the stigma associated with utilizing governmental assistance keeps people from accessing that care, especially in rural communities that value self-reliance and autonomy (Wagenfeld, 2003). Furthermore, the women in our sample are also mothers and subsequently at an increased disadvantage in their health (Riebschleger, 2007) because they frequently put their own needs, including health-related issues, behind those of their children and even partners (Leipert & George, 2008; Simmons et al., 2012).

Although previous studies have demonstrated that marriage promotes financial stability, social ties, and supportive relationships (Mirowsky & Ross, 2003) that are tied to positive health behaviors such as preventive care (Lee et al., 2005), we found being married (43%) or living with a partner (16%) was associated with a decrease in healthcare utilization. This is especially surprising given the high rate of self-reported health problems. In addition, marriage was not associated with financial stability, because all participants’ household income was 200% below poverty. The protective nature of marriage for health outcomes and health care utilization may elude rural low-income women, who often face stressors not faced by their urban counterparts, such as traditional role expectations. Moreover, they have significantly fewer occupational, social, and mental health resources to cope with such stressors. The “cultural strain” of traditional gender-role expectations on rural women predominates despite the fact that rural women have entered the workforce at higher rates (Burton, Lichter, Baker, & Eason, 2013). As a result, women’s work is often undervalued in economic and social terms (Riebschleger, 2007). Traditional role expectations place importance on women as the primary caregivers within the home and community, despite any economic hardship the family may face. Ironically, within our model the relationship between being single and a decrease in symptoms of depression was nearly significant, suggesting this is an important future area of research for understanding how family constellations, role expectations, health status, and healthcare utilization are interrelated

CONCLUSION

Research focused on the health care needs of rural low-income women must move beyond traditional health indicators to explore how various influences on health, gender, and family roles, and the experience of place intersect to affect health and health decision making. Researchers and policy makers must acknowledge that health status is a unique outcome—based upon contextual vulnerabilities and opportunities that rural low-income women experience—and the influence of these contextual factors differs when considered in combination. Thus, to effectively personalize care to rural individuals and communities, interventions cannot be singularly focused, but rather, must consider the multiple influences to have the greatest chance of success. Indeed, in recent years, multiple health behavior change interventions have grown in popularity, because they attend to the complex realities of people's lives and address related behaviors and risk factors simultaneously (Evers & Quintiliani, 2013). Importantly in this rural sample, we found that factors previously identified as opportunities may indeed be risks, adding an additional layer of complexity when considering the development of interventions that attend to several influences simultaneously. Indeed, given that rural health disparities have remained relatively static despite efforts to improve them, our study suggests that improvements in rural health and health care will not be realized until interventions account for these relationships.

LIMITATIONS

Although this study demonstrates important findings, it is not without its limitations. First, this sample was not nationally representative, and participants self-selected by responding to advertisements in local food stamp, Medicaid, and WIC office sites across 14 states. This self-selection process skews findings toward those more likely to participate in formal social support services, and consequently, the findings are not representative of all low-income rural women. Second, participants were provided incentives to participate in the study. Although the incentives were small, it is possible that this influenced whether rural women participated in the study, especially in light of their limited resources. This coupled with the sampling technique, resulted in a highly homogenous group, which decreased the variability in factors associated with health risk among this population. Finally, findings were in relationship to self-reported health problems as opposed to formal health diagnoses, which may have affected the reliability of the results. Despite these limitations, this study provides an important foundation for designing future interventions designed to promote health and well-being among rural, low-income mothers that consider the complexities of life for this vulnerable population.

NOTE

1. Participating were: California, Colorado, Indiana, Kentucky, Louisiana, Maryland, Massachusetts, Michigan, Minnesota, Nebraska, New Hampshire, New York, Oregon, and Wyoming.

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