Rural and Remote Health
MEDLINE listed
ARHEN
FRAME
ISSN 1445-6354
The International Electronic Journal of Rural and Remote Health Research, Education, Practice and Policy

ORIGINAL RESEARCH

Health decision-making among rural women: physician access and prescription adherence

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Submitted: *28 August 2010;* ***Revised:*** *20 December 2010;* ***Published:*** *11 March 2011*

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Rural and Remote Health **11: 1599. (Online), 2011**

Available from: http://www.rrh.org.au

ABSTRACT

Introduction: Rural residents and women have been identified as forming US population groups who experience health disparities, including access barriers to health care. Rural women are at significantly higher risk for poor health outcomes than their urban counterparts, and they are the 'gatekeepers' of their families' health, thus influencing the health of the broader community. Not seeking or adhering to care recommendations may extend the course of disease, thereby protracting patients' problems and increasing the burden of disease on the community. In this research, factors were examined related to physician access and prescription adherence among rural, low-income women.

Methods: Data from Rural Families Speak (n = 266), a US multi-state study, were analyzed using multivariate logistic regression.

Results: Women with depressive symptoms and more chronic health conditions were less likely to access a physician, while those who had health insurance and perceived greater physician availability were more likely to access a physician. Health insured women were less likely to delay or forgo filling prescriptions.

Conclusions: Interventions in rural areas should increase knowledge about available primary care services and prescription assistance programs.

Key words: health decision-making, physician access, prescription adherence, rural, USA, women.

Introduction

In a recent report, the Agency for Healthcare Research and Quality[1] identified both rural residents and women as segments of the US population that experience health disparities, including disparities in access to medical care. In fact, research has shown rural residents experience important barriers to utilizing health care, including limited financial resources, lack of health insurance, lack of transportation, distance to care facilities, and shortages of qualified practitioners[2-9] . Research on rural women's access to health care is more limited, but it suggests similar disparities to rural residents in general, such as lack of health insurance, lack of a primary care physician, and living in communities with few providers[10,11]. Other work has shown rural women are dissatisfied with the kinds of medical services available, which affects access[12], or are largely unaware of options available to them for care[13]. Findings from studies in Canada support these themes, showing that women living in rural areas are not only geographically isolated from accessing care, but also experience a variety of sociocultural factors that impact their health-seeking behaviors[13,14]. In order to develop appropriate public health interventions that increase receipt of medical care, more research is needed to identify the personal and community factors that impact the health decision-making of rural women, especially those factors which impede rural women from utilizing health services when needed. This knowledge is especially important, because rural women are at significantly higher risk for poor health outcomes than their urban counterparts[7,8]. Additionally, rural women play the primary role in family healthcare decision-making[10], making them the 'gatekeepers' for their families' health, and thus the health of the broader community[12]. Consequently, reducing health disparities among rural women requires that public health professionals better understand the components of and barriers to women's health decisions.

By seeking to understand the variety of factors that influence and ultimately may determine health behaviors, multilevel, ecological approaches developed in the fields of public health, psychology, and sociology have shown promise in identifying and addressing personal, social, and health problems[15]. Importantly, these approaches call us to situate phenomena in a context of intrapersonal, interpersonal, institutional, community, and larger cultural and policy factors, all of which influence the phenomena either directly or indirectly[16,17]. Health decisions and health behavior are a function of a dynamic and complex interaction of these factors[16]. From smoking cessation programs to obesity prevention, ecological perspectives, have been successful in investigating health behaviors[18-21].

Reschovsky and Staiti[8] and Davidson, Andersen, Wyn, and Brown[22] distinguished between individual and community/systemic characteristics of healthcare access and outcomes. Decisions about and utilization of health services by low-income populations are influenced by individual characteristics including attitudinal, social and demographic predispositions, perceived and evaluated needs, and factors such as low socioeconomic status and lack of health insurance. Litaker, Koroukian, and Love's work[23] is indicative of the importance of including a variety of contexts when exploring health behaviors and decision-making. For example, researchers have shown that poverty affects decision-making related to care, especially among food-insecure patients, or patients who are unable to acquire enough food to meet caloric needs due to insufficient money or other resources[24]. Indeed, recent studies have shown that poverty, food insecurity, and rurality have all been correlated with depression, which may also influence health decision-making[25,26]. Further, lack of after-hours care, longer appointment wait times in rural community clinics, and even age (ie adults compared with children and seniors) are all associated with lower levels of entry into and continuity of primary care[6]. Further, through the availability of qualified professionals and/or facilities for care, the community context facilitates or impedes the ability to meet health needs[2,4,5,11,22,24].

Although research on factors associated with low-income rural women utilizing care is limited, findings to date suggest there are important personal and community barriers. For example, at the personal level, lack of insurance[3,6,9,10] and limited financial resources[4,8] have both been shown to be significant barriers to care and thus important influences on the health decisions made by rural women. Additional examples of personal-level barriers, some of which begin to exhibit the systemic interactivity of socio-ecological models by relating closely to other ecological levels, include lack of information and/or language barriers[7,9] and perceived stigmas, especially related to mental health issues[10,11]. Beyond these individual-level barriers exist larger systemic or community-level impediments. At this level, lack of public transportation[2,4], and distance to care facilities[5,7] significantly impede healthcare access, as does a shortage of practitioners[8,11].

Additionally, researchers have given increasing attention to prescription filling and adherence behaviors among underserved or disadvantaged populations. Adherence to prescriptions has been correlated with higher quality patient–physician relationships and few transportation problems[27]. Conversely, transportation difficulties, limited healthcare supply, lack of quality health care, social isolation, and financial constraints all have been shown to be key barriers to pharmaceutical care for rural adults[28]. The impact of financial constraints on prescription filling and adherence behaviors among rural and low-income populations cannot be overstated. A higher percentage of prescriptions are paid for with cash (18% vs 13%) and Medicaid (16% vs 10%) in rural areas than in urban areas[27]. While programs that provide outpatient medication assistance[29-33], patient advocacy[30], and identification of and assistance to high-risk populations[31,34] have demonstrated effectiveness in overcoming financial and geographic barriers to health care and prescription access and utilization, these programs have not become widespread.

The purpose of this study was to examine individual and community variables associated with the health decisions of rural women specifically related to accessing a physician and filling prescriptions. Not seeking or adhering to care recommendations may extend the course of disease, thereby protracting patients' problems and increasing the burden of disease on the community. As such, a deeper understanding of the various factors influencing these decisions may have important implications for clinical practice and policy making. Specifically, this study sought to answer the following research questions:

- which demographic-, individual-, and community-level factors influence whether rural, low-income women visit a doctor when needed?
- which of these factors influence whether these women delay or forgo filling prescription medications?

Findings have the potential to increase contextual understanding of factors associated with rural women's health decisions, which may lead to development and testing of appropriate health services interventions for this underserved population.

Methods

Data

Analyzed data were from two sources. The primary data source came from a USDA-funded project known as Rural Families Speak (RFS, NC-223/NC-1011), which is a multi-state (CA, IN, IA, KY, LA, MD, MA, MI, MN, NE, NH, NY, OH, OR, SD, WV), longitudinal study of low-income rural women and their families designed to better understand how rural families were faring after national Welfare Reform in 1996. The RFS protocol was approved by an institutional review board at all study sites. Participants from 23 rural counties were included in the study. 'Rural' was defined using Butler and Beale's rural–urban continuum codes[35], and the majority of participants (72.4%) lived in counties rated 6 (population of 2500 to 19 999, adjacent to metro area), 7 (population of 2500 to 19 999, not adjacent to metro area), or 8 (completely rural or <2500 urban population, adjacent to

metro area). The remaining participants lived in states without Beale codes of 6 through 8. However, participants lived in counties with population centers that did not exceed 10 000. Data from women participating in RFS were matched to data from the Community Health Status Indicators Project (CHSI)[36] based on the participants' county of residence. The CHSI is a publicly available, nationwide data set on over 200 public health indicators. Data were obtained from a variety of federal agencies, including the Department of Health and Human Services and the Centers for Disease Control, and are reported at the county level and. Reliability and validity for the dataset as a whole are not provided; however, data were compiled and calculated in such a way that definitions and calculations of health measures were consistent across communities (counties) and data sources.

Sampling and recruitment for 'Rural Families Speak'

A convenience sample of 413 participants was solicited for inclusion in wave 1 of RFS. Participants were recruited via flyers from places that serve low-income families, including social service agencies, Head Start programs, low-income housing units, and public health clinics. The flyers described study details and eligibility requirements. To be eligible women had to be at least 18 years, have at least one child under the age of 14, and be eligible for Food Stamps or the Supplemental Nutrition Program for Women Infants and Children (WIC). Interested volunteers called the state's study coordinator, who reconfirmed eligibility and scheduled interviews. On average, 18 participants came from each county (range 10–43 participants), and the percent of persons living at or below the federal poverty line in each county averaged 12.7% (range 4.8–23.1%).

Data collection for 'Rural Families Speak'

All participants provided informed consent prior to data collection. Trained interviewers conducted 3 in-person interviews in the participants' native language (English or Spanish), annually between 2000 and 2002. Both quantitative and qualitative self-report data were collected using an interviewer-administered questionnaire. Quantitative data included questions from validated instruments. Qualitative data included questions that pertained to specific constructs measured in the quantitative protocol. Depending on the study site, participants were compensated $20–$50 for their time based on regional rates of remuneration (ie differences in cost of living).

Sample

For the current study, quantitative data were analyzed only from Wave 3 ($n = 266$) collected in 2002 matched with county-level data from the CHSI. The focus was on Wave 3, because these data included an expanded section on health, and specifically the dependent variables of interest (not seeing a doctor when needed and delaying or not filling prescribed medications), which were not available in the first two waves. The health section was expanded in Wave 3, based on findings from the previous 2 years of data that revealed the importance of health in these rural women's lives. Additional data about the women's mental and physical health status, as well as new data on access to and utilization of health care, were included. Given that the RFS qualitative protocol was specific to the quantitative data collected, and given that quantitative county-level data were matched from another source, analysis of the qualitative data were not included in the current study, because the qualitative data could not be triangulated with the CHSI data.

Measures

The ecological models suggested by Reschovsky and Staiti[8] and Davidson et al[22] delineate 3 levels of independent variables: (i) intrapersonal; (ii) interpersonal; and (iii) community level influences. The present study measured variables according to this model.

The dependent variables included two self-reported, dichotomous variables that assessed two forms of health decision-making. The first variable was a report of whether in the last year the participant needed to see a physician but

did not go (yes = 1/no = 0). Need was defined as having a health concern that the participant thought might require and/or improve with medical attention. The second variable was a report of whether in the last year the respondent did not fill or postponed filling medication that was prescribed by a healthcare provider (yes = 1/no = 0).

Intrapersonal demographic variables included age, race/ethnicity, marital status, educational attainment, employment status, and family level of poverty. *Age* was measured continuously. *Race/Ethnicity* was measured by 4 categories (White, Latina, Black, and other). *Marital status* was measured using 3 categories (single, married/living with partner, and divorced, widowed, or separated). *Educational level* also was measured in 3 categories (less than a high school degree (<12 years), high school degree or equivalent (12 years), and more than a high school degree (>12 years). *Employment status* was dichotomous (employed = 1/unemployed = 0). *Family poverty level* was measured continuously as the family's income as a percent of the federal poverty line in the year of data collection.

Three intrapersonal health variables were measured. *Chronic health conditions* were measured using the summed score on an index of 15 conditions based on Sturm and Wells'[37] study of morbidities associated with poverty. These conditions included arthritis, asthma, back problems, bladder infections, cancer, chronic pain, diabetes, heart problems, hepatitis, high blood pressure, liver problems, migraines/headaches, permanent disability, reproductive problems, and seizure disorder. For each condition, women reported whether they had the disorder (1) or not (0). A higher score (range = 0–15) indicated more chronic health conditions. Chronbach's α for this scale was 0.57 in the sample. *Depression* was measured using the Center for Epidemiologic Studies-Depression Scale (CES-D), which was designed to measure depressive symptoms in the general population[38]. The instrument includes 20 items on a 4-point Likert scale. Total scores range from 0 to 60 with a cut-off score of 16 indicating symptoms of clinical depression. The cut-off score was used to categorize women as having or not having clinically significant depressive symptoms (1/0). Reliability for the CES-D in the general population and this sample was α = 0.85. An *injury or illness* in the last year was measured dichotomously (yes = 1/no = 0), indicating whether the participant had an injury or illness that affected activities of daily living.

Two interpersonal health variables were measured. Interpersonal health variables were defined as those factors that are commonly influenced by individual experience and decision-making in combination with outside influences, such as employment that provides health insurance, marriage to a partner who has health insurance, and/or interaction with others who may convey health-related information, such as a social worker, friend, family member, or religious advisor. *Health insurance status* was measured dichotomously (insured = 1/uninsured = 0). Whether the respondent *believed there were primary care services available* in her community was also measured dichotomously (yes = 1/no = 0).

Three community health variables were analyzed:

1. The *rate of primary care physicians* (measured continuously according to the number of primary care physicians per 100 000 people living in the county).
2. Whether there was a *community health center* in the county (measured dichotomously as yes = 1/no = 0).
3. Whether the county was in a *health professional shortage area* (also dichotomous as yes = 1/no = 0).

Data analysis

All data were analyzed using STATA 9.0 (STATA Corp; College Station, TX, USA). First, descriptive statistics were computed for the sample (proportions for categorical variables and means and standard deviations for continuous variables). Then univariate logistic regression models were run to assess individually the intrapersonal, interpersonal, and community factors associated with not seeing a physician when needed and delaying or not filling prescriptions. In order to capture the effects of all ecological

models, a hierarchical variable entry procedure was used for each multivariate model and entered variables in 4 blocks corresponding with the four layers of ecological influence: intrapersonal demographic variables (age, race/ethnicity, educational status, marital status, family poverty level), intrapersonal health variables (chronic health conditions, depression, injury or illness in the last year), interpersonal health variables (health insurance status and belief that primary care physicians are available in the community), and community health variables (county primary care physician rate per 10 000 people, presence of a community health center, and whether the county is in a health physician shortage area). This approach is consistent with meeting the minimum requirement of 10 outcome events per predictor variable in logistic regression[39]. Probabilities were expressed as odds ratios, and significance was defined as $p \leq 0.05$. The final multivariate models were used for interpretation.

Results

Descriptive statistics

Demographic characteristics are presented (Table 1). Respondents were on average 30.8 years of age (SD = 7.5). The majority (65.8%) identified as White, followed by Latina (20.7%), Other (7.1%) and Black (6.4%). Just over one-half had a high school degree (28.6%) or less (24.4%), while 47.0% had some education beyond high school. Most respondents (63.2%) were married or living with a partner, while 19.5% were single and 17.3% were divorced, separated, or widowed. More than half were employed (57.8%), and nearly three-quarters (71.5%) had health insurance. The majority (89.0%) also believed there were primary care physicians available in their communities. There was a high prevalence of clinically significant depressive symptoms (40.8%). Women reported 1.67 chronic health conditions (SD = 1.68), and 30% reported an injury or illness in the last year. The average primary care physician rate per 10 000 people was 55.2 (SD = 18.7), and 16.2% of counties were in health professional shortage areas, while 31.2% had a community health center. Regarding unmet needs, 29.6% of participants reported they did not access a physician when they needed, and 30.5% reported delaying or forgoing filling prescriptions.

Physician access

The results are presented of the multivariate logistic regression model for the probability of not accessing a physician when needed (Table 2). When the first block of demographic variables was entered, no statistically significant variables emerged. When the second block of health variables was entered, having more chronic health conditions (OR = 1.33, $p = 0.01$) and having clinically significant depressive symptoms (OR = 2.08, $p = 0.03$) were both associated with increased odds of not seeing a physician when needed. After entering the third block, depressive symptoms (OR = 4.17, $p = 0.001$) and chronic health conditions (OR = 1.33, $p = 0.02$) remained significant. Further, both having insurance (OR = 0.31, $p = 0.02$) and believing primary care physicians were available in the respondent's community (OR = 0.28, $p = 0.02$) were associated with decreased likelihood of not accessing a physician when needed. In the final model, after community variables were entered in block 4, there were no significant changes in the model. Women with depressive symptoms (OR = 4.44, $p = 0.001$) and more chronic health conditions (OR = 1.38, $p = 0.02$) were significantly less likely to access a physician when needed. Conversely, health insured women (OR = 0.29, $p = 0.01$) and women who believed primary care physicians were available in the respondent's community (OR = 0.21, $p = 0.01$) were significantly more likely to access a physician when needed. The community factors of physician rate, presence of a health center, and being located in a health professional shortage area were not associated with physician access.

Table 1: Demographic characteristics

Characteristic	Percent
Age – mean (SD)	30.8 (7.5)
Race/ethnicity	
White	65.8
Latina	20.7
Black	6.4
Other	7.1
Educational level	
<12 years	24.4
12 years (high school degree)	28.6
>12 years	47.0
Marital status	
Single	19.5
Married/living with partner	63.2
Divorced/widowed/separated	17.3
Employment status	
Employed	57.8
Unemployed	42.2
Chronic health conditions – mean (SD)	1.67 (1.68)
Depression	
Yes	40.8
No	59.2
Injuries/illnesses	
Yes	30.0
No	70.0
Health insurance status	
Insured (public or private)	71.5
Uninsured	28.5
Think primary care physicians in county	
Yes	89.0
No	11.0
Primary physicians/10 000 – mean (SD)	55.2 (18.7)
Community health center in county	
Yes	31.2
No	68.8
Health professional shortage Area	
Yes	16.2
No	83.8
Did not access physician	
Yes	29.6
No	70.4
Delayed/did not fill prescription	
Yes	30.5
No	69.5

Table 2: Multivariate logistic regression model for not accessing a physician when needed

Factor	Block 1 Odds Ratio	Block 2 Odds Ratio	Block 3 Odds Ratio	Block 4 Odds Ratio
Age	1.020	.999	1.000	.990
	(.022)	(.023)	(.030)	(.031)
Race/ethnicity				
White	Ref	Ref	Ref	Ref
Latina	.480	.580	.399	.525
	(.225)	(.278)	(.235)	(.440)
Black	.778	1.140	.478	.471
	(.468)	(.721)	(.593)	(.728)
Other	1.980	2.215	1.775	2.289
	(1.191)	(1.467)	(1.353)	(1.916)
Marital Status				
Single	Ref	Ref	Ref	Ref
Married/cohabiting	.486	.535	.521	.612
	(.189)	(.219)	(.280)	(.339)
Div/widow/sep	.590	.745	.937	1.007
	(.288)	(.383)	(.565)	(.618)
Educational Level (years)				
< 12	Ref	Ref	Ref	Ref
12	1.033	1.008	.775	.837
	(.464)	(.471)	(.442)	(.480)
> 12	1.149	.919	.703	.750
	(.501)	(.421)	(.388)	(.421)
Poverty	.999	1.000	1.003	1.003
	(.002)	(.002)	(.002)	(.003)
Employment status				
Employed	Ref	Ref	Ref	Ref
Unemployed	.786	1.174	1.642	1.993
	(.260)	(.430)	(.793)	(1.009)
Chronic health conditions		1.330**	1.332*	1.377*
		(.146)	(.167)	(.183)
Depression				
No		Ref	Ref	Ref
Yes		2.081*	4.166***	4.435***
		(.713)	(1.846)	(2.012)
Injuries/illnesses				
No		Ref	Ref	Ref
Yes		1.432	1.292	1.277
		(.512)	(.581)	(.580)
Health insurance status				
No			Ref	Ref
Yes			.312*	.291*
			(.151)	(.146)
Believe physicians available				
No			Ref	Ref
Yes			.285*	.208**
			(.157)	(1.25)
Primary care physician rate				1.022
				(.015)
Community health center				
No				Ref
Yes				.497
				(.396)

Table 2: cont'd

Factor	Block 1 Odds Ratio	Block 2 Odds Ratio	Block 3 Odds Ratio	Block 4 Odds Ratio
Health professional shortage area				
No				Ref
Yes				1.254 (1.159)
Chi-Square (df)	12.4(10)	29.25(13)**	39.42(15)***	41.95(18)***
Pseudo R-square	0.05	0.11	0.20	0.21

Div, Divorced; sep, separated.
*Significant at $p < 0.05$; **significant at $p < 0.01$; ***significant at $p < 0.001$

Prescriptions

The results of the multivariate logistic regression model for not filling or postponing filling a prescription medication is presented (Table 3). Within the block of demographic variables, only having a high school degree was associated with an increased likelihood of delaying or not filling prescribed medications (OR = 2.53, $p = 0.04$). After entering the second block of health variables, having a high school degree continued to be associated with increased odds of delaying or not filling prescriptions (OR = 2.63, $p = 0.04$). Having an injury or illness was the only significant health variable, and it was associated with increased odds of delaying or not filling prescriptions (OR = 2.68, $p = 0.004$). When the interpersonal health variables were entered in block 3, high school degree was no longer significant. Injuries/illnesses in the last year continued to be statistically significant (OR = 3.47, $p = 0.003$), while having health insurance was associated with decreased odds of not filling prescriptions (OR = 0.29, $p = 0.01$). In the final model, after entering the community health variables, again injuries/illnesses and being insured were associated with delaying or not filling prescriptions. Women with health insurance were less likely to delay or not fill prescriptions (OR = 0.27, $p = 0.01$), while women with injuries and illnesses were more likely to delay or not fill prescriptions (OR = 3.92, $p = 0.01$).

Discussion

This study examined the relationships among intrapersonal, interpersonal, and community factors and health decision-making related to seeing a physician and prescription adherence in rural women. Findings suggest that intra- and interpersonal factors most influenced this sample of rural women's lack of access to care. Specifically, women with more chronic health conditions and depression were less likely to access a physician when needed. Conversely, women who believed primary care physicians were available in the community were more likely to access a physician when needed. Women with health insurance also were less likely to delay or forgo filling prescriptions, while women reporting injuries and illnesses in the last year were more likely to delay or not fill prescriptions. Community factors such as county primary care physician rate, living in a health professional shortage area, and living in a county with a community health center were not related to accessing physicians or adhering to prescriptions after controlling for intra- and interpersonal factors.

Table 3: Multivariate logistic regression model for not filling prescriptions

Factor	Block 1 Odds Ratio	Block 2 Odds Ratio	Block 3 Odds Ratio	Block 4 Odds Ratio
Age	.990	.981	.963	.963
	(.022)	(.024)	(.030)	(.032)
Race/ethnicity				
White	Ref	Ref	Ref	Ref
Latina	.424	.485	.441	.561
	(.188)	(.221)	(.230)	(.474)
Black	.358	.417	.268	.132
	(.248)	(.302)	(.333)	(.195)
Other	.377	.387	.223	.261
	(.304)	(.332)	(.255)	(.305)
Marital Status				
Single Ref	Ref	Ref	Ref	
Married/cohabiting	.893	.943	.914	.782
	(.357)	(.401)	(.508)	(.452)
Div/widow/sep	.550	.532	.643	.582
	(.294)	(.302)	(.422)	(.392)
Educational level (years)				
< 12	Ref	Ref	Ref	Ref
12	2.530*	2.630*	2.369	2.203
	(1.170)	(1.257)	(1.377)	(1.338)
> 12	2.277	2.313	3.151	3.048
	(1.068)	(1.137)	(1.862)	(1.857)
Poverty	.999	.999	1.001	1.001
	(.002)	(.002)	(/002)	(.002)
Employment status				
Employed	Ref	Ref	Ref	Ref
Unemployed	.923	1.214	1.670	1.421
	(.301)	(.432)	(.758)	(.661)
Chronic health conditions		1.183	1.157	1.091
		(.124)	(.145)	(.142)
Depression				
No		Ref	Ref	Ref
Yes		.991	.870	.858
		(.347)	(.392)	(.393)
Injuries/illnesses				
No		Ref	Ref	Ref
Yes		2.680**	3.471**	3.919**
		(.915)	(1.470)	(1.724)
Health insurance status				
No			Ref	Ref
Yes			.295**	.267**
			(.137)	(.130)
Believe physicians available				
No			Ref	Ref
Yes			.970	1.415
			(.541)	(.847)
Primary care physician rate				.978
				(.013)
Community health center				
No				Ref
Yes				.949
				(.771)

Table 3: cont'd

Factor	Block 1 Odds Ratio	Block 2 Odds Ratio	Block 3 Odds Ratio	Block 4 Odds Ratio
Health professional shortage area				
No				Ref
Yes				2.526 (2.210)
Chi-Square (df)	14.77(10)	27.97(13)**	31.82(15)**	36.93(18)**
Pseudo R-Square	0.05	0.11	0.16	0.19

Div, Divorced; sep, separated.
*Significant at $p \leq 0.05$; **significant at $p \leq 0.01$.

Women with more chronic health conditions and depression were less likely to go to the doctor when needed. This suggests that rural women may be at high risk for delaying seeking treatment for symptoms associated with chronic or emergent health conditions, especially when financial resources are limited, as in this sample. Research suggests that rural women with depressive symptoms may not recognize the symptoms as depression[11]. Thus, they may attribute somatic symptoms to something other than a mental health problem, or make a decision that the problem is not severe enough to seek treatment given other pressing needs in the family. Future research should investigate the role of poor mental health in healthcare decision-making, especially in rural areas where rates of mental health disorders among women are high[40-42] and the perceived stigma associated with having a mental health problem that prevents many rural residents from seeking treatment[43].

Believing that physicians were available in the community increased the likelihood that women sought a doctor when needed. This is an important finding, given the research that suggests low physician availability is a key barrier to healthcare access[4,11,22]. Interestingly, the actual availability of healthcare services (healthcare providers, community health centers, or living in a health professional shortage area) was not a significant factor in the model. This is counter to other research that has shown low provider availability in rural areas is a key barrier to be addressed[11,44,45]. This finding may reflect the nature of the dependent variable. That is, this study focused on women's perceived need for a physician and their decisions around prescribed medications, which likely involve different decision-making processes than accessing preventive care. Other research has suggested that availability is also subjective; that is, while there may be providers practicing in the area, the hours or location may not be suitable or they may be viewed as transient due to high rates of out-migration and thus not worth attempting to establish care[46]. Future research should examine factors associated with different kinds of healthcare seeking decisions (ie emergent versus routine/preventive) and interventions that simultaneously improve rural residents' knowledge about what medical services are available and increase the actual availability of services themselves should be developed and tested.

Given the current context of healthcare reform, an interesting finding was that health insurance was not associated with increased likelihood of seeing a physician when needed and not filling prescribed medications. This finding is counter to other research that has demonstrated health insurance is an important enabling factor that enhances access to care[6,9,11,22]. A partial explanation may be the already high rate of un-insurance in the sample (28.5%). In rural areas, health insurance coverage is particularly challenging, because most jobs are low-wage and provide few benefits[3,10]. Further, working rural residents may make too much to qualify for their state health insurance plans. As such, public health efforts should focus on educating low-income people regarding their eligibility for Medicaid and how to apply for insurance. Public policies to expand Medicaid eligibility for

working poor families would especially benefit rural, low-income women like those in this sample[47]. Additionally, prescription assistance programs, while shown to be effective[29-34], may need to be better utilized and expanded in rural areas to offset insurance and financial capacity shortfalls. Recommended practices related to Medicaid access include examination of Medicaid policies and procedures, education for providers and families, developing regional health networks or collaboratives, and involving consumers in defining access issues[48,49]. Previous research has identified stigmas associated with utilizing or needing to utilize Medicaid[50]. Consequently, research and practice efforts also should address how stigma within rural communities influences the decision to use or not use Medicaid and other health services for low-income people.

Having a serious injury or illness within the past year was associated with failure or delay in filling prescriptions when other factors were controlled. This finding suggests low-income women who experience unexpected health needs may forgo treatment due to limited financial resources. This is a serious public health concern, because rural areas experience high rates of unintended injuries[51]. Women may be prolonging illness and/or making themselves more susceptible to illnesses and injuries becoming chronic in nature, thereby compromising their long-term health and wellbeing. This offers further support for the need to expand Medicaid coverage and educate rural residents about what services are available to them.

Some studies have shown that rural women may access providers other than physicians, such as public health nurses[52], and that many may opt for more traditional medicines or complementary and alternatives medicines[53]. Research should examine both the variety of providers rural women access, including the use of complementary and alternative therapies, and the types of conditions for which they seek different kinds of care. This would help researchers and practitioners better understand health behaviors and health decision-making among rural women, including the best ways to implement healthcare reforms.

The status of current research is simple and clear: rurality affects women's health in multiple ways[54]. Future research into the ecological factors influencing unmet healthcare needs will assist professionals and policy makers in reducing unmet needs. Feasibility and implementation studies for prescription assistance programs, high-risk patient advocacy, and rural healthcare infrastructure should be conducted. This study suggests that an ecological approach to understanding unmet healthcare needs is both useful and appropriate. Health decisions and health behaviors are the result of potentially complex and multi-factorial models, as suggested by the literature and some of the preliminary findings in this article. However, it is impossible to fully capture, expound, and integrate each of these factors in one article. Detailed research into separate ecological factors – intrapersonal, interpersonal, community, and policy – is thus needed to expand our knowledge of and ability to address unmet health needs for rural women. This research should not simply explore factors at each individual level, but should continue to integrate multiple ecologic levels in theory and analysis.

Limitations

While this sample includes women from rural areas in 16 states, the women in this study do not comprise a representative sample. As such, findings may not be generalizable to all rural, low-income women. In addition, data are self-reported. A review of actual medical records may be more accurate as women in this study may have under- or over-reported their physician and prescription access. Data also were taken from a cross-sectional sample. Therefore, no causal associations can be made. Future studies should include representative samples and data from medical records. Additionally, the study examined only two measures of unmet health needs among rural women – not accessing a physician when needed and failure or delay in filling prescriptions – both of which represent illness behaviors as opposed to preventive behaviors. Other potential ecological indicators of unmet needs should be examined, such as the role these factors in increasing preventive health behaviors and healthcare access. Such data may best be captured through qualitative or mixed-method

research. Finally, this article assumes that accessing a physician when needed and prescription adherence are inherently 'desirable' activities in this population. However, rural woman may not necessarily agree with this assumption. In fact, a recent study showed that the underlying culture of self-reliance among low-income rural people contributes to a reluctance to seek medical care until a health problem interferes with daily functioning[55]. More research that explicitly incorporates the perspectives and underlying cultural beliefs of low-income rural women would improve understanding about values that influence health decision-making.

Conclusions

Findings from this study indicated significant influences on unmet needs at two ecological levels, intrapersonal and interpersonal, suggesting the need for expanded healthcare services and education related to available services. While community level factors were not significant, it is clear that knowledge about community healthcare systems, including available providers, was an important intrapersonal factor associated with health decision-making. As such, public healthcare systems need to focus not only on developing greater community capacity for providing care, including increasing the types and quality of available services, but also ensure that low-income women living in rural areas have the knowledge about these services. Greater consumer education is needed to overcome this barrier. Further, there is a need to conduct additional research, especially qualitative research and research that explores various ecological barriers, to better understand the phenomena at work when health needs are not met. This combined approach may improve access to care and improve the overall health and wellbeing of rural women in the USA.

Acknowledgements

This research was supported in part by USDA/CSREES/NRICGP Grant 2001-35401-10215, 2002-35401-11591, and 2004-35401-14938 and NIH/NIDA Grant 5 K12 DA014040-07 (Simmons). The opinions expressed herein are solely those of the authors.

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Published 11 March 2011; modified 29 March 2011.
A correction was made to presentation of the data in Tables 2 and 3.