

12-31-2015

The Impact of Rurality, Community Attachment, and Community Involvement on Health Among Rural Texans

Jin Young Choi
Sam Houston State University, jyc002@shsu.edu

E. Miranda Reiter
Sam Houston State University

Gene L. Theodori
Sam Houston State University, glt002@shsu.edu

Follow this and additional works at: <https://egrove.olemiss.edu/jrss>



Part of the [Rural Sociology Commons](#)

Recommended Citation

Choi, Jin, E. Reiter, and Gene Theodori. 2015. "The Impact of Rurality, Community Attachment, and Community Involvement on Health Among Rural Texans." *Journal of Rural Social Sciences*, 30(1): Article 2. Available At: <https://egrove.olemiss.edu/jrss/vol30/iss1/2>

This Article is brought to you for free and open access by the Center for Population Studies at eGrove. It has been accepted for inclusion in *Journal of Rural Social Sciences* by an authorized editor of eGrove. For more information, please contact egrove@olemiss.edu.

**THE IMPACT OF RURALITY, COMMUNITY ATTACHMENT, AND
COMMUNITY INVOLVEMENT ON HEALTH AMONG RURAL
TEXANS**

JIN YOUNG CHOI*

SAM HOUSTON STATE UNIVERSITY

E. MIRANDA REITER

SAM HOUSTON STATE UNIVERSITY

and

GENE L. THEODORI

SAM HOUSTON STATE UNIVERSITY

ABSTRACT

This study examines the differences in three health status indicators by rurality and the effects of community attachment and involvement on health among rural residents in Texas. We use the 2013 Texas Rural Survey (TRS) data, which include information on a representative sample of 757 rural Texas residents. The results show that the three health status indicators – self-rated general health, functional status of physical health, and functional status of mental health – are predicted by different factors. Overall, residents in small places often reported better health than those in medium-sized and large places. Community attachment and involvement were shown to have beneficial effects on health status, but they affect different aspects of health. Stronger community attachment is significantly predictive of better self-rated general health and functional status of mental health, while involvement in a greater variety of community organizations is closely associated with functional status of physical health. Suggestions for future research and policy implications are discussed.

While the extant health disparity literature has often focused on differences between urban and rural populations (Eberhardt and Pamuk 2004; Liu et al. 2012), less attention has been given to the considerable health disparities existing within rural areas in the United States (Weierbach et al. 2013). Studies have documented that self-rated health and health outcomes, such as mortality and morbidity rates, vary by community size and geographic location (Kroneman et al. 2010; Lewis et al. 2006; Monnat and Pickett 2011; Morton 2004). For example, Monnat and Pickett (2011) found an inverse relationship between self-rated health and rurality, often defined by population size and adjacency to metropolitan areas; residents of remote rural areas tend to report poorer self-rated health. Morton (2004) showed that large nonmetropolitan communities and rural communities adjacent to metropolitan areas often had lower mortality rates than small, remote rural

*Address correspondence to: Jin Young Choi, Department of Sociology, Sam Houston State University. Campus Box 2446, Huntsville, TX 77341-2446. Email: jyc002@shsu.edu

communities. Residents living in the most remote rural areas tend to report the highest rates of pulmonary heart disease (Call, Casey, and Radcliff 2000).

Health disparities within rural areas have been explained by variations in socioeconomic characteristics of both individuals and communities. Studies have shown that individuals living in small, remote rural areas are more likely to be poor (Ormond, Zuckerman, and Lhila 2000), experience material hardship (Center for American Progress 2011), and lack health insurance (Hale, Bennett, and Probst 2010; Maine Rural Health Research Center 2009). Small, remote rural communities often had more socioeconomic disadvantages such as higher rates of unemployment and population loss, as well as lower levels of educational attainment (Monnat and Pickett 2011). Moreover, small, remote rural areas have a low level of investment in health infrastructure and limited health care resources (e.g., fewer physicians and health care facilities, weak or nonexistent public transportation system, longer distance to health care provider, lower quality of healthcare) (Bennett, Olatosi, and Probst 2008; Burrows, Suh, and Hamann 2012; Choi 2012; Fordyce et al. 2007; Office of Shortage Designation 2013). Empirical evidence suggests that such disadvantaged socioeconomic characteristics of individuals and the community structures of small, remote rural areas place rural residents at a greater risk of poor health (Holmes et al. 2006; Monnat and Pickett 2011; National Rural Health Association 2013).

The effects of community attachment and community involvement on individual health and well-being have garnered attention in the health literature and might offer an explanation for rural health disparities. Community attachment, commonly measured with affective indicators (e.g., emotions, sentiments, feelings) and local social bonds, can be a source of social support (Jennings and Krannich 2013; Matarrita-Cascante et al. 2006; Theodori and Luloff 2000). Several studies have documented positive effects of community attachment on individual well-being (Grzeskowiak, Sirgy, and Widgery 2003; Kimweli and Stilwell 2002; Theodori 2001) and physical and mental health outcomes (Morita et al. 2010; Van Gundy et al. 2011; Young, Russell, and Powers 2004). Morita and colleagues (2010) reported a higher mortality rate among senior citizens with low levels of community attachment. For rural populations in particular, Van Gundy et al. (2011) found that community attachment offers protection against depressed mood among youth, and O'Brien, Hassinger, and Dershem (1994) reported an inverse relationship between community attachment and depressive symptoms among adults.

Community involvement, including volunteering and participation in community and social activities, also has potential benefits for physical and mental

HEALTH AMONG RURAL TEXANS

3

health. Higher levels of self-rated health have been linked with membership in religious or voluntary associations (Hyypä and Mäki 2003; Kawachi, Kennedy, and Glass 1999), participation in clubs and associations (Veenstra 2000), and volunteerism (Morrow-Howell et al. 2003). Furthermore, a significantly lower risk of hypertension was found among older adults who participated in volunteer service, compared with those who did not (Sneed and Cohen 2013).

As described above, studies have documented existing health disparities within rural areas and the potential health benefits of community attachment and involvement (Cohen and Syme 1985; Kawachi et al. 1997; Nummela et al. 2009; Theodori 2001; Van Gundy et al. 2011). However, to the best of our knowledge, no study has investigated the effects of community attachment and involvement as potential explanations for health disparities of rural residents by rurality. Thus, with this study we examine the differences in health status by rurality and the direct and indirect effects of community attachment and involvement on health status among rural residents, using the 2013 Texas Rural Survey data.

Unlike other studies that have used a single measure of health status, we employ three measures of health status: self-rated general health; functional status of physical health; and functional status of mental health. Although self-rated general health has been a valid and commonly used measure for overall health status, several studies have suggested the limitation of using a single-item measure (Abdulrahim and Asmar 2012; Agyemang et al. 2006; DeSalvo et al. 2006). Furthermore, despite the moderate to high correlation between self-rated general health and specific health dimensions, such as physical and mental health, these dimensions are not necessarily the same concepts (Kempen et al. 1998; Lee 2000), and may not be predicted by the same variables. Thus, besides self-rated general health, we include two other health measures in this study – functional status of both physical and mental health.

The specific research questions are:

1. Are there any differences in health status by rurality?
2. What are the effects of community attachment and community involvement on differences in health status among rural residents?
3. Are there differences in the predictors of the three health status indicators?

METHODS

Data

To investigate our research questions, we use data drawn from the 2013 Texas Rural Survey (TRS). The 2013 TRS was a self-administered survey conducted by researchers affiliated with the Center for Rural Studies at Sam Houston State University. The data were collected between June 2013 and August 2013 from a random sample of Texas residents living in 22 rural places using mail and online questionnaire procedures. Survey respondents provided extensive information on several major topics, including economic development strategies and efforts, public services and community amenities, environmental hazard issues, medical and healthcare services, and food, agriculture, and the natural environment.

To select a random sample of rural residents in Texas, researchers at the Center for Rural Studies began by identifying all places – both incorporated places and census designated places – throughout Texas with populations of 10,000 or less as possible study sites. Then, following the predetermined research design, one place within each of three population categories (499 or fewer, 500-1,999, and 2,000-10,000) was randomly selected as a study site within each of the seven Rural Economic Development Regions classified by the Texas Department of Agriculture. Because there are many places in the 499 or fewer population category in the West Region, an additional study site was added to the sample. In total, 22 places were randomly selected as study sites. The study sites included both incorporated places (concentrations of populations with legally defined boundaries) and census designated places (concentrations of populations that are locally identifiable by name but not legally incorporated) (U.S. Census Bureau 2012a).

The household survey data collection process followed a modified tailored design method (Dillman, Smyth, and Christian 2009). In early June 2013, an informational letter first was mailed to a random sample of 5,608 households across the 22 study sites. The informational letter, printed in English on one side and Spanish on the other, notified residents that their household had been randomly selected to participate in an upcoming study focused on rural Texas. The letter contained instructions for completing the questionnaire in one of two ways: (1) online at the provided URL, or (2) by returning the mailed questionnaire they would soon receive. Of the selected households, no rejections to participation in the study nor mistaken addresses were identified. Therefore, the final sample size remained at 5,608.

Later in June 2013, the survey questionnaire was mailed to the sampled households. To obtain a representative sample of individuals within the households,

HEALTH AMONG RURAL TEXANS

5

the cover letter requested that the adult in the household who had most recently celebrated his or her birthday would be the one to complete and return the survey. The 52-item survey questionnaire was offered in English and Spanish as a self-completion booklet and online, and it required approximately 50 minutes to complete. After the initial survey mailing and two follow-up mailings during July and August, 757 completed questionnaires were returned.

Variables

We selected variables related to health status, community attachment and involvement, size of place, as well as demographic and socioeconomic information from the 2013 TRS data. Table 1 presents the descriptive statistics of these variables.

Health Status. Three measures of health status were used for the dependent variables: self-rated general health, functional status of physical health, and functional status of mental health. Self-rated general health was measured on a scale from 1 to 5 by asking, “Overall, would you say your health is excellent, very good, good, fair, or poor?” More than one third (35.5%) of respondents reported their health as “excellent” or “very good.” About 41.7 percent reported “good” and 22.8 percent reported their health as “fair” or “poor.” The mean value of self-rated general health was 3.15. The functional status of physical health was measured by the number of days that physical health interfered with normal activities during the past 30 days (for convenience, it will be called “duration of physical health interference” from here on). About one quarter (24.1%) of respondents indicated that their physical health issues interfered with their daily activities at least one day during the past 30 days, with a mean of 3.43 days. The functional status of mental health was measured by the number of days that mental health interfered with normal activities during the past 30 days (for convenience, it will be called “duration of mental health interference” from here on). Approximately one tenth (9.7%) of respondents indicated that their mental health issues interfered with their daily activities at least one day during the past 30 days, with a mean of 1.59 days.

Community Attachment and Involvement. Community attachment was assessed with a multiple-item scale used in previous studies involving the concept (Theodori 2004, 2008; Theodori and Mayfield 2008). Respondents were asked to respond to the following eleven statements: (a) overall, I am very attached to this community; (b) I feel like I belong in this community; (c) the friendships and associations that I have with other people in this community mean a lot to me; (d) if the people in this community were planning something, I’d think of it as something we were doing

TABLE 1. SAMPLE DESCRIPTIVE STATISTICS

VARIABLES	n (%)
Health status	
Self-rated general health ^a	3.15 ± .96
Excellent or very good.....	242 (35.5)
Good.....	284 (41.7)
Fair or poor.....	156 (22.8)
Duration of physical health interference ^b	3.43 ± 8.37 149 (24.1)
Duration of mental health interference ^c	1.59 ± 6.05 61 (9.7)
Population size	
Small.....	195 (25.9)
Medium.....	307 (40.7)
Large.....	252 (33.4)
Community attachment ^d	3.00 ± .61
Community involvement ^e	1.78 ± 1.48
Demographics and socioeconomic characteristics	
Age ^f	59.94 ± 15.16
Gender	
Male.....	306 (43.8)
Female.....	392 (56.2)
Race	
White.....	527 (75.9)
Non-White.....	167 (24.1)
Living arrangement	
Single.....	209 (30.0)
Coupled.....	488 (70.0)

HEALTH AMONG RURAL TEXANS

7

TABLE 1. SAMPLE DESCRIPTIVE STATISTICS (*continued*)

VARIABLES	n (%)
Education attainment	
≤High school.....	226 (34.0)
≥Some college.....	439 (66.0)
Household income	
<TX median income.....	312 (48.2)
≥TX median income.....	335 (51.8)

NOTES: Total N= 757, but due to missing responses, some variables have less than 757 cases;

^aMean ± standard deviation: Scale is from 1 to 5. Frequency and percent are reported for each category; ^bMean ± standard deviation for the number of days which physical health interfered with daily activities during the past 30 days. Frequency and percent of respondents who reported that their physical health issues interfered with daily activities at least one day during the past 30 days are also reported; ^cMean ± standard deviation for the number of days which mental health interfered with daily activities during the past 30 days; frequency and percent of respondents who reported that their mental health issues interfered with daily activities at least one day during the past 30 days are also reported; ^dMean ± standard deviation: Scale is from 1 to 4; ^eMean ± standard deviation: Scale is from 0 to 5; ^fMean ± standard deviation

rather than they were doing; (e) if I needed advice about something, I could go to someone in this community; (f) I think I agree with most people in this community about what is important in life; (g) given the opportunity, I would move out of this community; (h) I feel loyal to the people in this community; (i) I plan to remain a resident of this community for a number of years; (j) I like to think of myself as similar to the people who live in this community; and (k) the future success of this community is very important to me. Response categories included (1) strongly disagree, (2) disagree, (3) agree, and (4) strongly agree. After reverse coding of item “g,” a composite community attachment score was calculated by averaging the values for the individual items. High scores reflected high levels of community attachment; low scores indicated low levels. A principal components factor analysis with varimax rotation revealed that these measures of community attachment were unidimensional and explained 58.6 percent of the variance. Cronbach’s alpha for this attachment scale was 0.93.

Community involvement was measured by asking whether respondents are involved in the following five types of community groups/organizations: (1) civic organizations (e.g., Rotary, VFW, Elks, 4H); (2) athletic teams or recreational

groups (e.g., softball, soccer); (3) educational or school groups (e.g., PTA, band boosters); (4) religious groups (e.g., Sunday school, choir, church board); and (5) county or community government (e.g., county board). The community involvement variable was calculated by adding involvement scores for these five types of community organizations, and the scores ranged from 0 to 5. The mean number of community organization types that respondents were involved in was 1.78, and 22.6 percent of respondents reported that they were not involved in any of the community organizations.

Rurality. Level of rurality is one of the key independent variables in the study. As a proxy measure, it was determined by population size of the place in which respondents lived. Respondents were grouped into one of three population categories: small rural places with a population of less than 500; medium-sized rural places with a population of 500 to 1,999; and large rural places with a population of 2,000 to 10,000. Although population size does not fully capture the comprehensive concept of rurality, it has been used as an indicator of rurality in other studies (Monnat and Pickett 2011; Thurston and Meadows 2003). About 26 percent of respondents resided in small places, while 40.7 percent and 33.4 percent of respondents lived in medium-sized and large places, respectively.

Demographic, Socioeconomic Characteristics. The demographic variables included gender, race, age, and living arrangement. About 44 percent of respondents were male and 56 percent were female. More than three quarters of respondents were White, while 24.1 percent were non-White. The age of respondents ranged from 19 years old to 79 years old, with a mean age of 60 years old. Living arrangement was measured based on six categories but recoded into a dichotomous variable: coupled and single. Seventy percent of the respondents had a living arrangement status of coupled, indicating that they were either “married” or “living with partner,” while 30 percent of respondents were single, meaning that they were either “single,” “divorced/separated,” “widowed,” or “other.” Socioeconomic status was measured by educational attainment and household income. More than one third of the respondents had a high school degree or lower, and 66 percent had completed at least some college, which is a much higher proportion than that of the Texas population (55.5% for those with age of 25 years or older) (U.S. Census Bureau 2012b). To measure household income, we asked respondents to indicate the income category in which their 2012 gross household income belonged. From several response categories, a dichotomous household income variable was created using \$50,000 as a cutoff point (less than \$50,000=0 and \$50,000 or more =1), which is close to the Texas median income in 2012 of \$51,563 (U.S. Census Bureau 2012c).

HEALTH AMONG RURAL TEXANS

9

About 52 percent of respondents reported an income higher than the Texas median level.

RESULTS

We use bivariate analyses to examine the gross effects of population size of place, community attachment, and involvement on the three health status indicators. A series of multiple regression analyses were conducted to examine the net effects of size of place (a proxy measure for level of rurality), community attachment, and community involvement on each health status indicator. Model 1 includes only population size besides demographic and socioeconomic characteristics. Community attachment and community involvement were added to Model 1 in Models 2 and 3, respectively. Model 4 is a full model including all three key independent variables.

Bivariate Results

Table 2 presents the results of bivariate analyses examining the effects of size of place, community attachment, community involvement, and demographic and socioeconomic factors on the three health status indicators: self-rated general health, functional status of physical health, and functional status of mental health. There was no significant difference in self-rated general health by size of place although respondents in small places reported better self-rated health, compared with those living in medium-size and large settlements. Both community attachment and involvement were significantly related to self-rated health, as respondents who had strong community attachment and involvement in a greater number of types of community organizations reported better self-rated health. All the demographic and socioeconomic characteristics except gender were significantly associated with self-rated health, for being younger, white, coupled, having at least some college education, and having a household income higher than the Texas median level, were related to better self-rated health.

The functional status of physical health, measured by duration of physical health interference, was not significantly different by population size of place although longer duration of physical health interference was found in larger places (2.91 days for small, 3.41 for medium-sized, and 3.88 for large places). Respondents with stronger community attachment often experienced fewer days of physical health interference, but the difference was only marginally significant. Meanwhile, the functional status of physical health was significantly associated with community involvement: respondents with greater variety of involvement in community

TABLE 2. BIVARIATE RESULTS FOR PREDICTORS OF SELF-RATED GENERAL HEALTH, DURATION OF PHYSICAL HEALTH INTERFERENCE, AND DURATION OF MENTAL HEALTH INTERFERENCE.

	SELF-RATED GENERAL HEALTH	DUR. OF PHYSICAL HEALTH INT.	DUR. OF MENTAL HEALTH INT.
Population size			
Small.....	3.25 ± .94	2.91 ± 7.28	1.17 ± 5.35
Medium.....	3.13 ± .94	3.41 ± 8.36	1.34 ± 5.45
Large.....	3.12 ± 1.01	3.88 ± 9.24	2.16 ± 6.97
Community attachment ^a.....	.16**	-.09*	-.11**
Community involvement ^a.....	.11**	-.08**	-.04
Age ^a	-.14**	.07**	-.02
Gender			
Male.....	3.16 ± .93	3.00 ± 8.02	.78 ± 4.51
Female.....	3.15 ± .97	3.56 ± 8.37	2.06 ± 6.71
Race			
White.....	3.21 ± .95	3.42 ± 8.35	1.65 ± 6.10
Non-White.....	2.94 ± .97	3.29 ± 8.29	1.20 ± 5.59
Living arrangement			
Single.....	3.01 ± 1.05	4.45 ± 9.42	2.64 ± 7.70
Coupled.....	3.21 ± .91	2.99 ± 7.88	1.16 ± 5.24
Education			
≤High school.....	2.84 ± .96	3.91 ± 8.92	2.13 ± 7.13
≥Some college.....	3.35 ± .91	2.73 ± 7.37	1.18 ± 5.11
Household income			
<TX median income.....	2.92 ± .98	4.93 ± 9.98	2.59 ± 7.74
≥TX median income.....	3.38 ± .85	2.17 ± 6.49	.84 ± 4.38

NOTES: ** $p < .05$, * $p < .10$; ^aCorrelation coefficients.

HEALTH AMONG RURAL TEXANS

11

organizations experienced fewer days of physical health interference. Among demographic and socioeconomic characteristics, only age and household income were significantly related to the functional status of physical health. Duration of physical health interference increased as respondents' age increased. Low income respondents often experienced longer duration of physical health interference, with a mean of 4.93 days for low income versus 2.17 days for high income. Single respondents were more likely than coupled respondents to experience longer duration of physical health interference (a mean of 4.45 days for single vs. 2.99 days for coupled), but the difference was only marginally significant.

Similar to the other two health status indicators, the functional status of mental health, measured by duration of mental health interference, was not significantly different by size of place although longer duration of mental health interference was found in larger places (1.17 days for small places, 1.34 for medium-sized places, and 2.16 for large places). On the other hand, the functional status of mental health was significantly associated with community attachment, but not with community involvement. Respondents with a higher level of attachment often experienced fewer days with mental health interference. Regarding demographic and socioeconomic characteristics, gender, living arrangement, and household income were significantly related to the functional status of mental health. Females reported a mean of 2.06 days of mental health interference, compared with 0.78 days for males. Being single and having a low income (2.64 days and 2.59 days, respectively) were related to longer duration of mental health interference, compared with 1.16 days for coupled and 0.84 days for high income.

Multivariate Results

Table 3 presents coefficients from multiple regressions of self-rated general health. Across all models, better self-rated health was consistently significantly related to being younger, having at least some college education, and having an income higher than the Texas median household income. Overall, whites often reported better health than non-whites, but the racial effect was substantially affected by the inclusion and exclusion of community attachment (see Models 2 and 4). Gender and living arrangement were not significant predictors of self-rated health.

Model 1 shows the effects of population size after controlling for demographic and socioeconomic characteristics. Respondents who live in medium-sized and large places often reported poorer self-rated health, compared with those in small places, but the differences were marginally significant ($p < 0.10$). There was no difference

TABLE 3. UNSTANDARDIZED AND STANDARDIZED COEFFICIENTS OF REGRESSION MODELS PREDICTING SELF-RATED GENERAL HEALTH

MEASURES	MODEL 1		MODEL 2		MODEL 3		MODEL 4	
	B	β	B	β	B	β	B	β
Male.....	-.04	-.02	-.01	.00	-.02	-.01	.00	.00
White. ....	.22**	.10	.17*	.08	.18**	.08	.17	.08
Age.	-.01**	-.12	-.01**	-.14	-.01**	-.10	-.01**	-.13
Single.....	-.09	-.05	-.08	-.04	-.07	-.03	-.08	-.04
≥TX median income. ....	.23**	.12	.22**	.12	.25**	.13	.22**	.12
≤High school.	-.33**	-.16	-.32**	-.16	-.31**	-.15	-.31**	-.16
Population size – medium ^a	-.17*	-.09	-.18*	-.10	-.19*	-.10	-.19**	-.10
Population size – large ^a	-.19*	-.10	-.18*	-.09	-.19*	-.09	-.19*	-.09
Community attachment. ....			.24**	.15			.21**	.14
Community involvement. ....					.06**	.09	.03	.05
Constant.	3.64		3.01		3.48		3.01	
R ².....		.11		.14		.12		.14
F.....		9.17**		9.63**		8.50**		8.82**

NOTES:** $p < .05$, * $p < .10$; ^aThe reference category is small place. When the reference category for “population size” is medium, the coefficients of population size change as follows: Model 1: B= .17* and β = .08 for small place and B= -.02 and β = -.01 for large place; Model 2: B= .18* and β = .09 for small place and B= .01 and β = .00 for large place; Model 3: B= .19* and β = .09 for small place and B= .00 and β = .00 for large place.; Model 4: B= .19** and β = .09 for small place and B= .00 and β = .00 for large place.

HEALTH AMONG RURAL TEXANS

between medium-sized and large places. Models 2 and 3 introduced community attachment and community involvement, respectively. Their net effects were statistically significant at the 0.05 level; the stronger the community attachment and the greater the number of types of community organization involvement, the better the self-rated general health. Once community attachment and community involvement were held constant in Model 2 and Model 3 respectively, the differences in self-rated health between small and medium-sized places and between small and large places remained marginally significant. On the other hand, in Model 4 where both community attachment and involvement were held constant, the difference between small and medium-sized places became significant, while the difference between small and large places remained marginally significant, and the difference between medium-sized and large places remained insignificant. In this full model including all the variables, community attachment remained an independent, significant predictor of self-rated health, while the effect of community involvement was no longer significant.

Table 4 shows the results of multiple regression analyses of the functional status of physical health. The only consistently significant predictor among demographic and socioeconomic characteristics was household income. As compared to the low income group, the high income group often experienced 1.7 to 1.9 fewer days of physical health interference. Age was positively related to the duration of physical health interference, but the association was marginally significant.

The effect of population size on functional status of physical health was significant across all models. Compared with those living in small places, respondents living in large places experienced 2.2 to 2.3 days more of physical health interference. However, the differences between respondents living in small and medium-sized places and between those living in medium-sized and large places were not statistically significant at the 0.05 level. When community attachment and community involvement were introduced respectively in Models 2 and 3, stronger community attachment and involvement in greater variety of community organizations were significantly associated with a decreased duration of physical health interference. In Model 4 community involvement remained a significant predictor, while the effect of community attachment was no longer significant.

Table 5 presents the results of the multiple regression models predicting the functional status of mental health. Household income was the only significant predictor among demographic and socioeconomic characteristics at the 0.05 level. Overall, high income was associated with a decreased duration of mental health

TABLE 4. UNSTANDARDIZED AND STANDARDIZED COEFFICIENTS OF REGRESSION MODELS PREDICTING DURATION OF PHYSICAL HEALTH INTERFERENCE.

MEASURES	MODEL 1		MODEL 2		MODEL 3		MODEL 4	
	B	β	B	β	B	β	B	β
Male.....	-.20	-.01	-.36	-.02	-.32	-.02	-.41	-.03
White. ....	.57	.03	.95	.05	.89	.05	.97	.05
Age. ....	.05*	.09	.05*	.09	.03	.07	.04*	.08
Single.....	.49	.03	.44	.03	.30	.02	.32	.02
≥TX median income.	-1.90**	-.12	-1.80**	-.12	-1.83**	-.12	-1.72**	-.11
≤High school. ....	.82	.05	.72	.04	.57	.03	.58	.03
Pop size – medium ^a	1.42*	.09	1.30	.08	1.32	.08	1.32	.08
Pop size – large ^a	2.25**	.14	2.15**	.13	2.29**	.14	2.28**	.14
Community attachment.			-1.32**	-.10			-.91	-.07
Community involvement.					-.64**	-.12	-.52**	-.10
Constant.	-.69		3.09		1.05		3.07	
R ².....	.05		.06		.06		.07	
F.....	3.45**		3.47**		3.80**		3.66**	

NOTES: ** $p < .05$, * $p < .10$; ^aThe reference category is small place. When the reference category for “population size” is medium, the coefficients of population size change as follows: Model 1: B= -1.418* and β = -.079 for small place and B= .829 and β = .050 for large place. Model 2: B= -1.299 and β = -.073 for small place and B= .855 and β = .052 for large place. Model 3: B= -1.322 and β = -.075 for small place and B= .967 and β = .058 for large place. Model 4: B= -1.320 and β = -.074 for small place and B= .961 and β = .058 for large place.

TABLE 5. UNSTANDARDIZED AND STANDARDIZED COEFFICIENTS OF REGRESSION MODELS PREDICTING DURATION OF MENTAL HEALTH INTERFERENCE.

MEASURES	MODEL 1		MODEL 2		MODEL 3		MODEL 4	
	B	β	B	β	B	β	B	β
Male.....	-.75	-.06	-.91*	-.08	-.85	-.07	-.94*	-.08
White.	1.06*	.08	1.20*	.09	1.14*	.08	1.22*	.09
Age.	-.02	-.04	-.01	-.02	-.02	-.04	-.01	-.02
Single.....	.63	.05	.67	.05	.61	.05	.63	.05
≥TX median income.	-1.27**	-.11	-1.09*	-.09	-1.21**	-.10	-1.08*	-.09
≤High school. ....	.90	.07	.88	.07	.84	.06	.86	.07
Pop size – medium ^a. ....	.35	.03	.37	.03	.35	.03	.37	.03
Pop size – large ^a.....	.86	.07	.93	.07	.95	.07	.97	.08
Community attachment.			-1.11**	-.11			-1.04**	-.11
Community involvement.					-.24	-.06	-.10	-.03
Constant.	1.87		4.58**		2.28*		4.57**	
R ².....		.04		.05		.04		.05
F.....		2.73**		3.17**		2.63**		2.89**

NOTES: ** $p < .05$, * $p < .10$; ^aThe reference category is small place. When the reference category for “population size” is medium, the coefficients of population size change as follows: Model 1: B = -.353 and $\beta = -.026$ for small place and B = .503 and $\beta = .040$ for large place. Model 2: B = -.366 and $\beta = -.027$ for small place and B = .568 and $\beta = .044$ for large place. Model 3: B = -.349 and $\beta = -.026$ for small place and B = .602 and $\beta = .047$ for large place. Model 4: B = -.369 and $\beta = -.027$ for small place and B = .600 and $\beta = .047$ for large place.

interference, but this effect was influenced by inclusion and exclusion of community attachment – the effect of household income became less significant after controlling community attachment (see Models 2 and 4). Whites often experienced more days affected by mental health interference than their non-White counterparts, but the difference was marginally significant. There were no apparent differences in mental health by population size.

Community attachment was a consistently strong and significant predictor of the functional status of mental health, as an increased level of community attachment was associated with a decreased duration of mental health interference (Models 2 and 4). Community involvement was not a significant predictor in any of the models.

DISCUSSION AND CONCLUSIONS

This study demonstrates how rurality, community attachment, and community involvement influence health status of rural residents in Texas. We found that the differences in the three health status indicators among rural residents are not only explained by their demographic or socioeconomic characteristics, but also by their levels of community attachment and involvement and the population size of the place in which they live.

Rurality was a significant predictor of health disparities in rural areas, in line with other studies (Eberhardt 2001). However, our study showed that residents in small places often reported better health than those in medium-sized and large places, which is inconsistent with other studies presenting an inverse relationship between rurality and health (Monnat and Pickett 2011; Morton 2004). Larger and more urbanized settlements often have better healthcare infrastructures and resources, which enable their residents to have greater accessibility to quality health care and thus better health outcomes (Morgan 2002). Simultaneously, however, it is also possible that less healthy rural residents choose to live in larger places to gain access to better quality health care and health resources that are not often available in small, remote rural places.

Our comparisons of bivariate and multivariate analyses (Model 1) for each health status indicator showed that health status differences by size of place became greater and significant when controlling for demographic and socioeconomic characteristics. This finding suggests that there is an influence of unobserved community characteristics (e.g., economic and environmental structure, health care facilities and physicians, public transportation system) on health status among rural residents regardless of individuals' demographics and socioeconomic characteristics.

It also suggests that residents' demographic and socioeconomic characteristics vary by population size of place, and such variation partly contributes to health status differences among rural residents.

Similar to findings of previous studies (Hyypä and Mäki 2003; Van Gundy et al. 2011), community attachment and community involvement were shown to have beneficial effects on health status, but they affect different aspects of health. Stronger community attachment was significantly predictive of better self-rated general health and functional status of mental health, while involvement in a greater variety of community organizations was closely associated with functional status of physical health. These associations were expected, considering that community attachment is associated with emotional and sentimental feelings toward one's community (Jennings and Krannich 2013; Matarrita-Cascante et al. 2006; Theodori and Luloff 2000), while community involvement often has a more physical component. Furthermore, a series of multivariate analyses showed that community attachment and involvement also indirectly influence self-rated health and functional status of physical health through size of place. This suggests that variations in the levels of community attachment and involvement by size of place (Conley 2005; Theodori and Luloff 2000) might relate to health disparities (Morita et al. 2010; Van Gundy et al. 2011; Young, Russell, and Powers 2004).

Three health status indicators – self-rated general health, functional status of physical health, and functional status of mental health – were predicted by different factors. Household income was the only variable that significantly predicted all three health status indicators. Higher income was associated with better health status, consistent with other studies (Kennedy et al. 1998; Shibuya, Hashimoto, and Yano 2002). Our final analytical models showed that size of place, community attachment, age, education, and household income were significant predictors of self-rated health. Size of place, community involvement, and household income were predictors of physical health functioning, while community attachment was the only significant predictor of mental health functioning. This finding supports that specific health dimensions are not necessarily the same concepts (Kempen et al. 1998; Lee 2000), and are not predicted by the same factors, and it suggests the importance of using multiple dimensions of health status in rural health disparities research.

A couple of limitations of this study should be noted. The first concern is the low response rate. Although the TRS data are based on a random sample, nonresponse can induce nonresponse bias (Groves 2006), as certain characteristics of those individuals who did not respond may differ from those who did respond.

Other limitations are related to our measurements. The population size of place is used as a proxy measure for rurality. Rurality is often defined by population size and adjacency to metropolitan areas, which can impact the quality and quantity of health resources available (Monnat and Pickett 2011; Morton 2004). Thus, the proxy measure does not fully capture the comprehensive meaning of rurality (Willits and Bealer 1967; Miller and Luloff 1981; Theodori 2009). Moreover, three categories of rurality based on population size do not reflect the structure-contextual variation of each place despite the potential impacts of the community structural context (e.g., environmental and socioeconomic structural factors, health care resources) on health disparities within rural areas.

The measure of community involvement is another concern. We added the number of organizational types in which the respondent was involved to measure community involvement. While representing an important aspect of community involvement, this measure did not consider the total number of organizations or the level of involvement in each organization (i.e., frequency and/or depth of involvement), which might predict health status better. Hyyppä and Mäki (2003) showed that active participation, not simply membership in voluntary associations, is conducive to good self-rated health in a dose-response relationship.

Despite the limitations, this study provides several contributions to the existing literature on rural health disparities. To our knowledge, this is the first study to investigate the differences in health status by size of place and the effects of community attachment and involvement on differences in health status among rural Texans. Furthermore, the use of three health status indicators allows us to examine the differential impacts of size of place, attachment, and involvement on various aspects of health. Second, our study showed that rural residents' health status significantly varies by their place of residency, suggesting further research on the roles of structural contexts of rural places (e.g., health-related resources, services, and infrastructure, environmental and socioeconomic structure) in shaping residents' health status and contributing to health disparities across rural communities. Third, our findings on the roles of community attachment and involvement propose support for health benefits of policy formation aimed at enhancing community attachment among residents of rural places/communities, as well as policies and initiatives to encourage community members to participate in volunteer and civic activities to improve or maintain physical functioning. Such initiatives should be tailored to each place, based on demographics and specific health needs and resources available.

AUTHOR BIOGRAPHIES

Jin Young Choi is an associate professor in the Department of Sociology at Sam Houston State University. Her research focuses on rural health issues and immigrant and minority health.

E. Miranda Reiter is a postdoctoral research associate in the Department of Sociology at Sam Houston State University. Her research interests include social epidemiology and health disparities.

Gene L. Theodori is a professor of the Department of Sociology at Sam Houston State University. He teaches, conducts basic and applied research, and writes professional and popular articles on rural and community development issues, energy and natural resource concerns, and related topics.

REFERENCES

- Abdulrahim, Sawsan and Khalil El Asmar. 2012. "Is Self-Rated Health a Valid Measure to use in Social Inequities and Health Research? Evidence from the PAPFAM Women's Data in Six Arab Countries." *International Journal for Equity in Health* 11:53.
- Agyemang, Charles, Semiha Denктаş, Marc Bruijnzeels, and Marleen Foets. 2006. "Validity of the Single-item Question on Self-rated Health Status in First Generation Turkish and Moroccans Versus Native Dutch in the Netherlands." *Public Health* 120:543-550.
- Bennett, Kevin J., Bankole Olatosi, and Janice C. Probst. 2008. *Health Disparities: A Rural – Urban Chartbook*. Columbia, SC: South Carolina Rural Health Research Center. Retrieved July 31, 2014 (http://rhr.sph.sc.edu/report/SCRHRC_RuralUrbanChartbook_Exec_Sum.pdf).
- Burrows, Elizabeth, Ryung Suh, and Danielle Hamann. 2012. *Health Care Workforce Distribution and Shortage Issues in Rural America* (Policy Brief). Kansas City, MO: National Rural Health Association.
- Call, Kathleen T., Michelle M. Casey, and Tiffany Radcliff. 2000. "Rural Beneficiaries with Chronic Conditions: Does Prevalence Pose a Risk to Medicare Managed Care?" *Managed Care Quarterly* 8(3):48–57.
- Center for American Progress. 2011. *Debt Deal Leaves Americans Living in Rural Poverty Behind*. Retrieved July 31, 2014 (<http://www.americanprogress.org/issues/poverty/news/2011/08/10/10189/debt-deal-leaves-americans-living-in-rural-poverty-behind/>).

- Choi, Jin Young. 2012. "A Portrait of Rural Health in America." *Journal of Rural Social Sciences* 27(3):1–16.
- Cohen, Sheldon and S. Leonard Syme. 1985. *Social Support and Health*. San Diego: Academic Press.
- Conley, Mary. 2005. "Connecting Rural Communities: Volunteering and Neighboring." *Points of Light Foundation and Volunteer Center National Network*. Retrieved July 31, 2014 (<https://www.nationalservicerresources.gov/files/m3245-connecting-rural-communities.pdf>).
- DeSalvo, Karen B., Nicole Bloser, Kristi Reynolds, Jiang He, and Paul Muntner. 2006. "Mortality Prediction with a Single General Self-Rated Health Question." *Journal of General Internal Medicine* 21:267–75.
- Dillman, Don. A., Jolene. D. Smyth, and Leah. Melani. Christian. 2009. *Internet, Mail, and Mixed-Mode Surveys: the Total Design Method, 3rd Edition*. New York: Wiley Press.
- Eberhardt, Mark S. 2001. *Health, United States, 2001: Urban and Rural Health Chartbook*. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Health Statistics.
- Eberhardt, Mark S. and Elsie. R. Pamuk. 2004. "The Importance of Place of Residence: Examining Health in Rural and Nonrural Areas." *American Journal of Public Health* 94(10):1682.
- Fordyce, Meredith A., Frederick M. Chen, Mark P. Doescher, L. Gary Hart. 2007. *2005 Physician Supply and Distribution in Rural Areas of the United States* (Final Report #116). Seattle, WA: WWAMI Rural Health Research Center, University of Washington.
- Groves, Robert M. 2006. "Nonresponse Rates and Nonresponse Bias in Household Surveys." *Public Opinion Quarterly* 70:646–75.
- Grzeskowiak, Stephan, M. Joseph Sirgy, and Robin Widgery. 2003. "Residents' Satisfaction with Community Services: Predictors and Outcomes." *Journal of Regional Analysis and Policy* 33:1–36.
- Hale, Nathan L., Kevin J. Bennett, and Janice C. Probst. 2010. "Diabetes Care and Outcomes: Disparities across Rural America." *Journal of Community Health* 35:365–74.
- Holmes, George M., Rebecca T. Slifkin, Randy K. Randolph, and Stephanie Poley. 2006. "The Effect of Rural Hospital Closures on Community Economic Health." *Health Services Research* 41:467–85.

- Hyypä, Markku T. and Juhani Mäki. 2003. "Social Participation and Health in a Community Rich in Stock of Social Capital." *Health Education Research* 18:770–9.
- Jennings, Brian M. and Richard S. Krannich. 2013. "A Multidimensional Exploration of the Foundations of Community Attachment among Seasonal and Year-Round Residents." *Rural Sociology* 78:498–527.
- Kawachi, Ichiro, Bruce P. Kennedy, and Roberta Glass. 1999. "Social Capital and Self-rated Health: A Contextual Analysis." *American Journal of Public Health* 89(8):1187–93.
- Kawachi, Ichiro, Bruce P. Kennedy, Kimberly Lochner, and Deborah Prothrow-Stith. 1997. "Social Capital, Income Inequality, and Mortality." *American Journal of Public Health* 87:1491–8.
- Kempen, Gertrudis I., Ida Miedema, Geertrudis. A. M. van den Bos, and Johan Ormel. 1998. "Relationship of Domain-specific Measures of Health to Perceived Overall Health among Older Subjects." *Journal of Clinical Epidemiology* 51(1):11–8.
- Kennedy, Bruce P., Ichiro Kawachi, Roberta Glass, and Deborah Prothrow-Stith. 1998. "Income Distribution, Socioeconomic Status, and Self-rated Health in the United States: Multilevel Analysis." *British Medical Journal* 317(7163):917–21.
- Kimweli, David M. S. and William E. Stilwell. 2002. "Community Subjective Well-Being, Personality Traits and Quality of Life Therapy." Pp. 193–225 in *Advances in Quality of Life Research 2001, Vol. 17, Social Indicators Research Series*, edited by B. Zumbo. Dordrecht, Springer Netherlands.
- Kroneman, Madelon, Robert Verheij, Margot Tacken, and Jouke van der Zee. 2010. "Urban–Rural Health Differences: Primary Care Data and Self-reported Data Render Different Results." *Health and Place* 16:893–902.
- Lee, Yunhwan. 2000. "The Predictive Value of Self Assessed General, Physical, and Mental Health on Functional Decline and Mortality in Older Adults." *Journal of Epidemiology and Community Health* 54:123–9.
- Lewis, Richard D., Mary C. Meyer, Salli C. Lehman, Fredrick L. Trowbridge, James J. Bason, Katy H. Yurman, and Zenong Yin. 2006. "Prevalence and Degree of Childhood and Adolescent Overweight in Rural, Urban, and Suburban Georgia." *Journal of School Health* 76(4):126–32.
- Liu, Ji-Hong, Sonya J. Jones, Han Sun, Janice C. Probst, Anwar T. Merchant, and Philip Cavicchia. 2012. "Diet, Physical Activity, and Sedentary Behaviors as Risk Factors for Childhood Obesity: An Urban and Rural Comparison." *Childhood Obesity* 8(5):440–8.

- Maine Rural Health Research Center. 2009. "Research and Policy Brief: Health Insurance Profile Indicates Need to Expand Coverage in Rural Areas." Retrieved July 31, 2014 (http://www.raonline.org/pdf/research_compendium.pdf).
- Matarrita-Cascante, David, Al E. Luloff, Richard S. Krannich, and Donald R. Field. 2006. "Community Participation in Rapidly Growing Communities in Southern Utah." *Community Development* 37:71–87.
- Miller, Michael K. and Al E. Luloff. 1981. "Who is Rural? A Typological Approach to the Examination of Rurality." *Rural Sociology* 46:608–25.
- Monnat, Shannon M. and Camille Beeler Pickett. 2011. "Rural/Urban Differences in Self-rated Health: Examining the Roles of County Size and Metropolitan Adjacency." *Health and Place* 17:311–9.
- Morgan, Alan. 2002. "A National Call to Action: CDC's 2001 Urban and Rural Health Chartbook." *The Journal of Rural Health* 18:382–3.
- Morita, Ayako, Takehito Takano, Keiko Nakamura, Masashi Kizuki, and Kaoruko Seino. 2010. "Contribution of Interaction with Family, Friends and Neighbours, and Sense of Neighbourhood Attachment to Survival in Senior Citizens: 5-year Follow-up Study." *Social Science and Medicine* 70:543–9.
- Morrow-Howell, Nancy, Jim Hinterlong, Philip A. Rozario, and Fengyan Tang. 2003. "Effects of Volunteering on the Well-Being of Older Adults." *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences* 58:S137–45.
- Morton, Lois Wright. 2004. "Spatial Patterns of Rural Mortality." Pp. 37–45 in *Critical Issues in Rural Health*, edited by N. Glasgow, N. E. Johnson, and L. W. Morton. Ames, IA: Blackwell Publishing.
- National Rural Health Association. 2013. "Policy Brief: The Future of Rural Health." Retrieved July 31, 2014 (www.ruralhealthweb.org/index.cfm)
- Nummela, Olli, Tommi Sulander, Antti Karisto, and Antti Uutela. 2009. "Self-rated Health and Social Capital among Aging People Across the Urban–Rural Dimension." *International Journal of Behavioral Medicine* 16:189–94.
- O'Brien, David J., Edward W. Hassinger, and Larry Dershem. 1994. "Community Attachment and Depression among Residents in Two Rural Midwestern Communities." *Rural Sociology* 59:255–65.
- Office of Shortage Designation. 2013. *Designated Health Professional Shortage Areas (HPSA) Statistics*. Bureau of Health Professions, Health Resources and Services Administration (HRSA), U.S. Department of Health & Human Services. Retrieved August 14, 2014 (<http://ersrs.hrsa.gov/ReportServer/Pages/>)

- ReportViewer.aspx?/HGDW_Reports/BCD_HPSA/BCD_HPSA_SCR50_Smry&rs:Format=HTML4.0).
- Ormond, Barbara, Stephen Zuckerman, Aparna Lhila. 2000. "Rural/Urban Differences in Health Care are Not Uniform across States." Number B-11 in *Series, New Federalism: National Survey of America's Families*. Urban Institute. Retrieved August 14, 2014 (http://www.urban.org/health_policy/url.cfm?ID=309533&renderforprint=1).
- Shibuya, Kenji, Hideki Hashimoto, and Eiji Yano. 2002. "Individual Income, Income Distribution, and Self-rated Health in Japan: Cross Sectional Analysis of Nationally Representative Sample." *British Medical Journal* 324(7328):16.
- Sneed, Rodlescia S. and Sheldon Cohen. 2013. "A Prospective Study of Volunteerism and Hypertension Risk in Older Adults." *Psychology and Aging* 28(2):578–86.
- Theodori, Gene L. 2001. "Examining the Effects of Community Satisfaction and Attachment on Individual Well-Being." *Rural Sociology* 66:618–28.
- _____. 2004. "Community Attachment, Satisfaction, and Action." *Community Development* 35(2):73–86.
- _____. 2008. "Constraints to the Development of Community." *Community Development* 39(2):91–110.
- _____. 2009. "Modification and Adaptation in Rural Sociology: Part I." *Southern Rural Sociology* 24(2):1–13.
- Theodori, Gene L. and A. E. Luloff. 2000. "Urbanization and Community Attachment in Rural Areas." *Society and Natural Resources* 13(5):399–420.
- Theodori, Gene L. and Chyrel A. Mayfield. 2008. "Attendance at Religious Meetings and Community Involvement." *Southern Rural Sociology* 23(1):266–76.
- Thurston, Wilfreda E. and Lynn M. Meadows. 2003. "Ruralty and Health: Perspectives of Mid-life Women." *Rural and Remote Health* 3(3):219.
- U.S. Census Bureau. 2012a. "Geography." Retrieved July 26, 2014 (<http://www.census.gov/geo/index.html>).
- _____. 2012b. 2008–2012 American Community Survey. Retrieved August 13, 2014 (http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_12_5YR_S1501).
- _____. 2012c. 2008–2012 American Community Survey 5-Year Estimates. Retrieved August 13, 2014 (http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_12_5YR_DP03).

- Van Gundy, Karen T., Nena F. Stracuzzi, Cesar J. Rebellon, Corinna Jenkins Tucker, and Ellen S. Cohn. 2011. "Perceived Community Cohesion and the Stress Process in Youth." *Rural Sociology* 76:293–318.
- Veenstra, Gerry. 2000. "Social Capital, SES and Health: an Individual-level Analysis." *Social Science and Medicine* 50:619–29.
- Weierbach, Florence M., Bernice Yates, Melody Hertzog, and Bunny Pozehl. 2013. "Differences and Similarities in Rural Residents' Health and Cardiac Risk Factors." *Online Journal of Rural Nursing & Health Care* 13:26–49.
- Willits, Fern K. and Robert. C. Bealer. 1967. "Evaluation of a Composite Definition of 'Rurality.'" *Rural Sociology* 32:165–77.
- Young, Anne F., Anne Russell, and Jennifer R. Powers. 2004. "The Sense of Belonging to a Neighborhood: Can It be Measured and is It Related to Health and Well-being in Older Women?" *Social Science and Medicine* 59: 2627–37.