

The Effects of Geographic Isolation and Social Support on the Health of Wisconsin Women

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ABSTRACT

Background: Rural residents are less likely to receive preventive health screening, more likely to be uninsured, and more likely to report fair to poor health than urban residents. Social disconnectedness and perceived isolation are known to be negative predictors of self-rated physical health; however, the direct effects of geographic isolation and social support on overall health have not been well elucidated.

Methods: A cross-sectional survey of women (n=113) participating in Wisconsin Rural Women's Initiative programming was conducted, which included measures of geographic isolation, an assessment of overall health, and social support using the validated Interpersonal Support Evaluation List with 3 subscales, including belonging support, tangible support, and appraisal support.

Results: Geographic isolation was shown to be a negative predictor of belonging support ($P=.0064$) and tangible support ($P=.0349$); however, geographic isolation was not a statistically significant predictor of appraisal support. A strong and direct relationship was observed between social support and self-perceived health status among this population of Wisconsin women, and hospital access based on geographic proximity was positively correlated ($P=.028$) with overall health status.

Conclusions: The direct relationship between social support and overall health demonstrated here stresses the importance of developing and maintaining strong social support networks, which can be improved through rural support groups that have the unique ability to assist rural residents in fostering social support systems, advocating stress management techniques, and achieving a greater sense of well-being.

INTRODUCTION

It is recognized that health disparities exist between rural and urban populations. With over 20% of the population in the United States living in rural areas, we cannot afford to neglect their physical and mental health.¹ Rural residents are more likely

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to be uninsured, less likely to receive preventive screening, less likely to meet recommendations from the Centers for Disease Control and Prevention for physical activity, and are more likely to report fair to poor health status than their urban counterparts.² Rural counties have higher death rates from chronic obstructive pulmonary disease, suicide, and unintentional injury compared to highly urbanized counties.³ It is universally accepted that many factors affect overall health, including both interpersonal and community factors, yet these rural-urban discrepancies are not completely understood.

Recently, attention to the effects of social isolation on both physical health and mental health has increased. Social isolation poses a significant risk factor for mortality and morbidity,^{4,5} as socially isolated individuals have a relative risk of 2.43 for cardiac mortality from coronary artery disease compared to individuals with strong

social support networks.⁶ Cornwell et al demonstrated that social disconnectedness and perceived isolation are negative predictors of self-rated physical health among a population of older adults.⁷ However, social isolation not only contributes to the physical manifestations of disease, but also plays a role in mental health. A large-scale study recently showed that the absence of frequently contacted close friends was significantly associated with major depressive disorder, dysthymic disorder, social phobia, generalized anxiety disorder, alcohol use disorder, and alcohol abuse disorder.⁸ While we are starting to grasp an understanding of the consequences of social isolation on physical and mental health, the exact mechanism has not been clarified.⁹ Opposite of demonstrations of social isolation's detriment to the health of rural populations, we see beneficial health impacts where social support exists. Recently, it was shown that social support serves as a positive predictor of health status among older rural breast

cancer survivors,¹⁰ and social support also influences or facilitates physical activity among cancer survivors.¹¹

Geographic isolation poses challenges such as managing chronic illnesses and hindering access to mental health professionals and domestic violence shelters.^{12,13} With the percentage of family physicians attending to women's gender-specific health needs declining,¹⁴ rural women in particular find themselves facing significant challenges accessing necessary health services. These women are less likely to receive preventive screening tests, including fecal occult blood tests, dental exams, Pap smears, and mammograms.¹⁵ Also, limited access to specialized surgeons, including for cases of breast cancer, can lead to less favorable outcomes in terms of survival.¹⁶

This research was guided by 3 specific hypotheses: (1) there will be an inverse relationship between geographic isolation and social support; (2) geographic isolation will negatively affect self-perceived health status; and (3) social support will positively affect self-perceived health status. The interplay between geographic isolation and social support has not been unraveled in the existing literature, and this information is necessary to understand the degree of social support that currently exists among rural Wisconsin women and to guide the development and testing of intervention programs designed to improve social support and overall health in rural populations.

METHODS

Participants

We used a cross-sectional survey of women participating in Wisconsin Rural Women's Initiative (WRWI) programming over a 2-year time period (January 28, 2011 to December 31, 2013). The WRWI is a nonprofit organization with over 15 years of experience hosting "gathering circles" for rural women throughout Wisconsin, focusing on generating social support and cultivating wellness. The survey collected demographic information, geographic and health information, and included several validated instruments to help us better understand the participant population. The demographic information we collected included age, race, and socioeconomic status. Here, socioeconomic status was measured simply by asking women whether their income was "sufficient to meet my needs," "more than enough to meet my needs," "less than enough to meet my needs," or "less than enough to meet my needs, but I have learned to live within my means." This classification was used rather than income data, because many farm women in our previous encounters had expressed challenges approximating income. Surveys were administered by WRWI staff, and all women participating in WRWI programming over this time period were asked to participate in the survey, with a 98% response rate. WRWI programming consisted of focused events for rural women, elderly women, and intimate partner violence (IPV) survivors. In total,

113 women took the survey and 12 of these women (10.62%) were IPV survivors. These data were included in all analyses, as this percentage is still below the reported prevalence (11%-44%) in community samples.¹⁷ While all surveys were taken anonymously, women's names were added to a list upon completion to ensure that no woman took the survey more than once. Oral consent was obtained from participants and all procedures were in accordance with a Medical College of Wisconsin Institutional Review Board (IRB) approved protocol.

Geographic Information

Geographic information was collected through several methods. Self-perceived rurality was assessed by asking women to describe their residence as urban, suburban, rural/farm, rural/nonfarm, or to specify if other. Women were asked to indicate the distance in miles between their homes and the following resources: neighbor, friend, courthouse, police station, hospital, and nearest village, town or city. Geographic isolation was assessed by calculating the mean distance to these resources. ZIP codes also were gathered to classify locations by Rural-Urban Commuting Area (RUCA) codes. We used the 2004 ZIP code data provided by the WWAMI Rural Health Research Center to classify residences by ZIP code as either urban, large rural, small rural, or isolated.¹⁸ Although there is no standardized definition of rural, ZIP code-based RUCA codes were used here given their frequent use in health research, since they can be used with ZIP code-related health data.¹

Overall Health

Self-perceived health was assessed by asking women to rate their general health as excellent, very good, good, fair, or poor. The survey also included an item to assess for chronic conditions that had been diagnosed previously by a doctor, including heart disease, diabetes, depression, anxiety, hypertension, asthma, insomnia, eating disorders, or cancer. Women also were allowed to write in any additional conditions that had been diagnosed by a doctor.

Social Support

Social support was assessed using a 12-item version of the Interpersonal Support Evaluation List (ISEL) scale.¹⁹ Each item was scored on a 4-point scale (1=definitely false, 2=probably false, 3=probably true, 4=definitely true). This scale serves as a measurement of perceived availability of 3 discrete functions of social support: tangible, belonging, and appraisal. The tangible subscale is a measure of the perceived availability of material aid. The belonging subscale is a measure of the perceived availability of people with whom one can do things. The appraisal subscale is a measure of the perceived availability of someone to talk about one's problems. The total ISEL score was calculated simply by summing the responses to all 12 questions, with higher scores indicating more social support.

Data Analysis

All data was analyzed using Stata/IC 12.1 (StataCorp LP, College Station, Texas). *P* values < .05 were considered statistically significant. In calculations of rural-urban differences, we used RUCA codes to create a dichotomous variable where isolated, small rural, and large rural categories were classified as “rural” and compared to the “urban” classification. Individuals who did not fill out ZIP code information (2 women) were simply not included in these analyses under the assumption this data was missing completely at random. To examine the relationship between geographic isolation and social support, we performed a linear regression analysis, while controlling for age and socioeconomic status. Race was not controlled for in any of our models since 98.2% of the participant population was white. We used 1-way ANOVA analysis to examine the association between social support and health status since the means of 4 groups were compared, and Bonferroni corrections were used to correct for multiple comparisons. We used an ordered logistic regression to determine the effect of geographic isolation on overall health status.

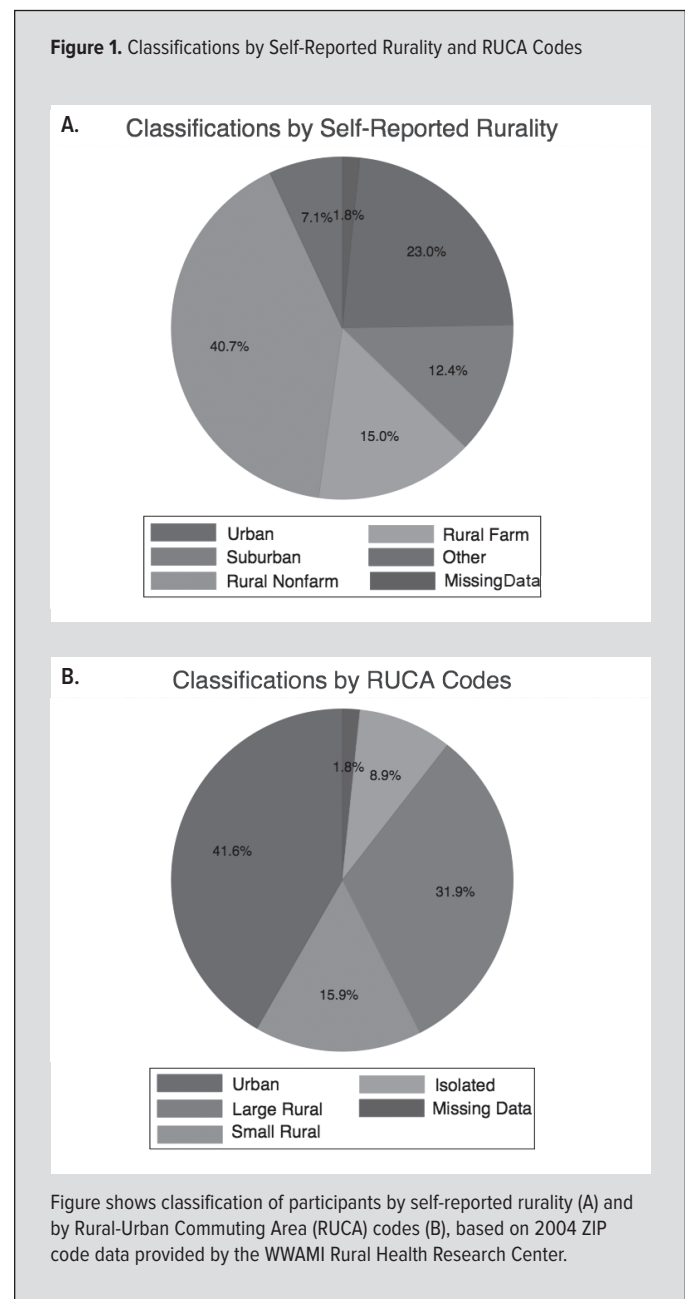
RESULTS

Description of the Study Population

Although WRWI programming is aimed at meeting the needs of rural women, not all women attending the programs were from designated rural areas. The term “rural” in the context of health policy and research holds many definitions,¹ so the research team used multiple tools to better characterize our participant population. We used both self-reported rurality and RUCA codes (Figure 1) to classify residence. Based on self-reported rurality, 61% of women lived in rural areas and 39% of women lived in urban areas. In order to look at rural-urban differences, we also used RUCA codes to create a dichotomous variable that classified women as either rural or urban. Based on RUCA code classifications, 58% of women lived in rural areas and 42% of women lived in urban areas. The average age of women in our study was 63 (range 25-93), and 98.2% of the participant population was white. The 3 most commonly reported health conditions among participants included hypertension (41.44%), depression (26.13%), and anxiety (20.72%).

Association Between Geographic Isolation and Social Support

Using a rural-urban dichotomy did not allow us to appreciate how social support is related to degree of geographic isolation, so we looked at this relationship using the mean value for geographic isolation. The correlation between geographic isolation and overall social support, when controlling for age and socioeconomic status, was not statistically significant ($P = .0628$, $R^2 = .0907$). However, when we assessed specific subscales of social support, we found that geographic isolation was a negative predictor of belonging support ($P = .0349$, $R^2 = .1003$) and tangible support ($P = .0064$, $R^2 = .1372$). Belonging support was assessed through

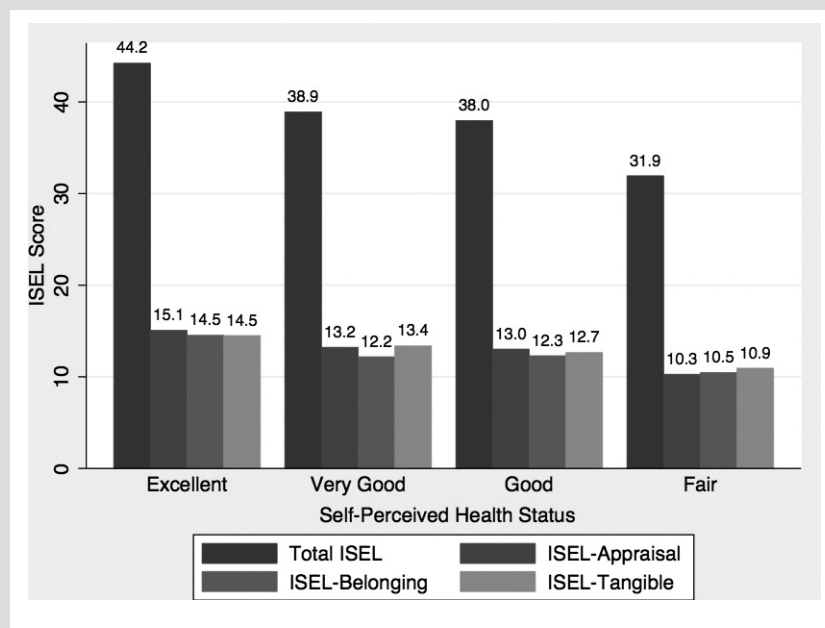


statements such as “If I wanted to have lunch with someone, I could easily find someone to join me” or “I don’t often get invited to do things with others.” Tangible support was assessed through statements such as “If I was stranded 10 miles from home, there is someone I could call who could come and get me” or “If I were sick, I could easily find someone to help me with my daily chores.”

Association Between Geographic Isolation and Health Status

Geographic isolation was not a statistically significant predictor of overall health status among this population of women ($P = .268$). However, hospital access ($P = .028$) and courthouse access ($P = .028$) were positively correlated with overall health status by ordered logistic regression. Access to a police station, neighbor,

Figure 2. Relationship Between Self-Perceived Health Status and Social Support Measured by the Interpersonal Support Evaluation List



Subscales of the Interpersonal Support Evaluation List also are shown. All values are presented as \pm SD.

friend, or nearest city were not statistically significant predictors of overall health status. One advantage of using a cross-sectional survey design to study a community sample was that we were able to gather health information from a population of women that may not be regularly visiting a health care provider.

Association Between Social Support and Health Status

Since social isolation poses a significant risk factor for morbidity,^{4,5} a major goal of this work was to determine the relationship between social support and overall health among this population of Wisconsin women served by the WRWI. As shown in Figure 2, a direct association between social support and self-perceived health status was observed that follows an apparent gradient. Women in excellent health had an average total ISEL score of 44.2 (out of 48) compared to an average total ISEL score of 31.9 among women in fair health. Women in excellent health also had statistically significant higher social support scores in all three of the measured subscales compared to women in fair health. Overall, 14 women reported being in excellent health, 45 in very good health, 46 in good health, 18 in fair health, and 0 women in our study reported to be in poor health.

DISCUSSION

The term “rural” often conjures up visualizations of picturesque farm fields and pastoral scenery; however, it is oftentimes a landscape of geographic isolation, limited resources, and reduced access to health care. Our first hypothesis, that there will be an

inverse relationship between geographic isolation and social support, did not yield a statistically significant overall result. Yet, 2 specific components of social support—belonging support and tangible support—were influenced by geographic isolation. Appraisal support, or the perceived availability of someone to talk about one’s problems, did not show any association with geographic isolation in this study. This was likely secondary to improved technology today, where physical distance no longer raises significant barriers to communication.

Secondly, our hypothesis that geographic isolation will negatively affect self-perceived health status revealed that only hospital access and courthouse access were statistically significant predictors of overall health. The travel burden for rural residents to visit health care services based on a cross-sectional survey of the National Household Travel Survey was an average of 17.5 miles for rural residents compared

with an 8.3 mile trip for urban residents.²⁰ Studying the proximity to other health care entities in the future, including general practice and subspecialty clinics, may reveal additional important information. Surprisingly, close proximity to a courthouse was associated with improved overall health in our study. Whether the courthouse (a town-based entity) simply serves as a marker for proximity to a larger metropolitan area, or whether it represents a sense of security translating to well-being, is unknown at this time. We did not find a statistically significant correlation between participants’ health and the distance from their homes to a police station, neighbor, friend, or nearest city.

Lastly, we initially hypothesized that social support will positively affect self-perceived health status. Here, we showed that WRWI participants from more geographically isolated areas in Wisconsin lack the perception of belonging support and tangible support compared to participants from less isolated areas. Although social support in the research context holds many definitions,²¹ one such definition states that “social support is defined as information leading the subject to believe that he is cared for and loved, esteemed, and a member of a network of mutual obligation.”²² Social support previously has been implicated in many health-related processes. Individuals with higher levels of social support exhibit more rapid and extensive functional and cognitive recovery after stroke,²³ and social support also has been shown to be a positive predictor of physical and mental health-related quality of life among women diagnosed with breast can-

cer,²⁴ and is related to fewer depressive symptoms among heart failure patients.²⁵ We further highlighted the direct relationship between social support and overall health, and these observations stress the importance of developing and maintaining strong social support networks.

Limitations

The recognized limitations of our study include the relatively small sample size (n=113), self-perceived measures of health, and the weaknesses inherent to cross-sectional surveys. Due to the cross-sectional survey design of this study, we are unable to determine causality between social support and overall health outcomes. Another challenge that persists in the study of rural health and the establishment of rural-urban disparities is determining the classification of rural versus urban. In the context of health care policy and research, this classification system is vital, yet there is considerable uncertainty as to how to apply rural taxonomies, since many classification systems exist. In an effort to minimize this limitation, we used RUCA-ZIP code approximations to draw the distinction between rural and urban populations, as RUCA-ZIP code approximations are very sensitive to demographic change and can differentiate rural areas according to their economic integration with urban areas and other rural areas.¹

Rural populations still fare worse among many dimensions of health compared to more urban populations,³ but rural support groups have the ability to assist residents in fostering social support systems, coping with and managing stress, and ultimately achieving a greater sense of well-being and health. Moving forward, it would be beneficial to compare measures of social support and overall health among participants in social networks like the WRWI to a control population, in order to determine the effects social support groups have on different measures of emotional well-being and perceptions of support. It is our hope that others will utilize existing support groups or create new ones to reach geographically isolated and inaccessible rural people in order to diminish the disadvantages they face.

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